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ABSTRACT

One of nine competency-based training modules for personnel preparation in early childhood special education, this guide focuses on assistive technology and technological interventions in preschool programs. All modules are adaptable for use with a general audience, direct service personnel, or administrators and are based on the following principles of the Ohio Department of Education's Division of Early Childhood Education: developmentally appropriate practice; integration of children with disabilities with typically developing peers; collaborative relationships with families; attention to individual needs; and provision for and valuing of diversity among young children and their families. modules are intended to be used in whole or in part, in groups or for self-instruction. Each module comprises goals; competencies (knowledge, skill, and values and attitudes); and objectives, with a matrix for each objective identifying enabling activities, resources, and leader notes. Relevant handouts, forms, and readings are provided for each objective. This module focuses on six goals: (1) gaining an overview of assistive technology and its curricular role; (2) familiarity with switch applications to increase the independent control and participation of young children; (3) understanding the basic use of computers and peripherals; (4) understanding of how computers and peripherals can be integrated into the curriculum; (5) gaining an overview of augmentative and alternative communication systems; and (6) obtaining practical information regarding funding for assistive technology devices and services. (Contains 34 references.) (DB)

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PROJECT

Modules for Competency-Based Personnel Preparation in Early Childhood Education

Technology

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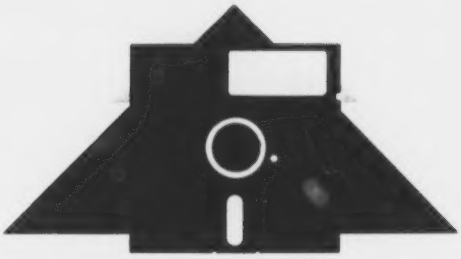

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These modules were developed through a grant funded by The Ohio Department of Education, Division of Early Childhood Education to the Cuyahoga Special Education Service Center.

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Dear Educators:

There is, perhaps, no more important issue to address in the field of early childhood education than the professional development of those individuals who work in this field. The results of numerous studies that have been conducted to assess the quality of programs currently available to our nation's young children and their families suggest that the training and quality of staff are critical determinants to quality programming.

In the area of early childhood special education, professional training needs are also recognized as paramount. The number of preschool programs for children with disabilities has grown rapidly in Ohio, thus creating a dramatic increase in the number of trained professionals needed to meet the resulting human resource demands. The training needs of this cadre of teachers, as well as other service personnel who face this challenge, is the focus of *Project Prepare.*

This series of nine competency-based training modules is the result of a commitment on the part of many individuals in the State of Ohio to quality services for young children. Their dedicated efforts are to be commended. *Project Prepare* reflects widely accepted principles of sound early childhood theory and practice; reflecting what we know about the development of all young children, and what we know about the development of young children who have special needs. We hope that these materials assist you in your efforts to provide quality early childhood education programs for all of Ohio's young children.

Sincerely,

Irene Bandy-Hedden

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ACKNOWLEDGEMENTS

The modules in this set were developed as a result of a commitment on the part of many professionals in the State of Ohio; a commitment to quality services for young children with special needs as well as those who are typically developing. A need was established for compentency-based early childhood personnel training that reflects a commitment to: (1) the integration of children with disabilities and those who are typically developing; (2) developmentally appropriate practice; (3) providing services that value and are sensitive to all diversity in a multicultural, pluralistic society; and (4) effective collaboration between parents and professionals.

The immediate need for a large cadre of well-prepared personnel sensitive to the needs of young children with disabilities was recognized by leadership in the Ohio Department of Education. With the establishment of the Division of Early Childhood Education, a forceful position was taken on behalf of all young children. Funding was then made available to the Cuyahoga Special Education Service Center for research and development in personnel preparation.

We gratefully acknowledge Dr. Irene Bandy-Hedden, Assistant Superintendent of the Ohio Department of Education and Dr. Jane Wiechel, Director of the Division of Early Childhood Education for the role they each played in creating the atmosphere and the arena in which Project Prepare was conceived and implemented. The contribution of Dr. Karen Sanders has been invaluable. Her support, guidance, and attention to detail has strengthened us and enabled us to ensure quality and consistency to the final products of Project Prepare.

We wish to thank the members of the Steering Committee and the Consistency Task Force. Their feedback and endless hours of review supplied input to the process of refining the modules. The professionals on the Reaction Panel contributed insightful feedback during the early stages of module development that enhanced the content and format of the modules. The technical staff, whose dependable assistance was a critical component of our working team provided the day-to-day nitty gritty backup assistance necessary to a quality finished product. Most of all, we would like to thank each member of the Module Development Teams who conceived, delivered, nurtured, and raised the "child" whose name is Project Prepare. We offer this fully functioning child up for adoption to the Special Education Regional Resource Service Centers, without whose membership and continued abiding interest in total quality staff development, Project Prepare would not have been possible.

To all those who provided wisdom in this endeavor, gave an extra hand when it was needed, shared in our frustrations, and laughed with us in our moments of joy, we extend our deepest thanks and gratitude.

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PROJECT PREPARE GENERAL INTRODUCTION

This module is one of nine competency-based personnel preparation modules designed to prepare professionals to employ best practices to meet the special needs of young children with disabilities. Each module was developed by an outstanding team as part of a statewide collaborative effort called Project Prepare. Project Prepare was funded by the Ohio Department of Education, Division of Early Childhood Education in concert with the network of Special Education Regional Resource Centers.

Each module targets a facet of best practice found to be critical in implementing a free appropriate public education specifically for three- to five-year-old children with disabilities. While this is the age focus of Project Prepare the modules are applicable for serving all young children. The module topics are:

Assessment,

Family Collaboration,

Individualized Education Program (IEP),

Preschool Integration,

Managing Behavior,

Planning,

Play,

Technology,

Transition.

This list of carefully selected topics does not exhaust all aspects of knowledge, skills, attitudes, and values that are important, even essential, in meeting the challenge posed in implementing the amendments, contained in P.L. 99-457, of the Individual with Disabilities Education Act (I.D.E.A.). However, each module does represent a "competency cluster," rather than a single competency, addressing several general objectives, each of which is broken down into specific knowledge, skill, and value/attitude objectives.

The teams were asked to monitor their own work on the basis of carefully determined criteria, which were then used throughout a multi-stage process of review. Several factors were scrutinized in order to keep the content philosophically consistent within each and across all modules. These premises are in harmony with the philosophical position of the Ohio Department of Education, Division of Early Childhood Education which in turn reflects best practices in the field of Early Childhood Special Education. The issues are summarized as follows:

Developmentally Appropriate Practice in accord with principles set forth by the National Association for the Education of Young Children (NAEYC).

Integration of children with disabilities in programs with their typically developing peers.

Collaborative relationships with families.

Attention to the special needs of each child with recognition of the child's abilities, as well as disabilities.

Provision for and valuing of all diversity among young children and their families (e.g., ability, cultural, racial, religious, gender, etc.).

A second criteria the module development teams were asked to consider in monitoring their work was adaptability. Adaptability was defined in three ways. First, each module needed to be adaptable in a demographic sense, that is, responsive to needs in diverse geographic settings (rural, urban, suburban) with diverse populations. Second, each module was designed for potential use with three different groups of participants:

General (e.g., parents, community groups);

Staff (direct service personnel, such as teachers and therapists);

Administrators (persons in leadership roles, such as building principals and program directors).

Some of each module's content may be applicable to all three potential "audiences" however, in many instances differentiation of content is appropriate, based on the anticipated needs of participants. Thus, while the same goals are indicated for the three groups of participants, these goals are translated in knowledge, skills, and value/attitude objectives appropriate to each group. Differentiation of objectives by audience and by type is shown in the following matrix taken from one of the modules.

GOALS

KNOW THE LEGAL AND ETHICAL BASIS FOR PRESCHOOL INTEGRATION

	GENERAL OBJECTIVE	STAFF OBJECTIVE	ADMINISTRATOR OBJECTIVE
COMPETENCY COMPONENT	Understand the legal and ethical basis for including children with disabilities in typical preschool programs.	Understand the legal and ethical basis for including children with disabilities in typical preschool programs.	Understand the legal and ethical basis for including children with disabilities in typical preschool programs.
KNOWLEDGE	Participants will identify the relevant sections from federal law which provide the legal preference for including children with disabilities in typical programs.	Participants will identify the relevant sections from federal law which provide the legal preference for including children with disabilities in typical programs.	Participants will identify the relevant sections from federal law which provide the legal preference for including children with disabilities in typical programs and the ethical issues related to this inclusion.
SKILL	Participants will explain from an ethical perspective, why children with disabilities should participate in typical preschool programs.	Participants will list "supplemental services" which might be necessary to enhance the participation of children with disabilities in typical programs.	Participants will synthesize legal requirements and ethical considerations related to inclusion by predicting the outcome of cases for specific children.
VALUE/ATTITUDE	Participants will list potential benefits of inclusion for children, families, and teachers.	Participants will give personal opinions of potential benefits of including children with disabilities in typical programs and means to make this inclusion possible.	Participants will generalize a philosophy statement to guide a school system in the direction of inclusion.

The third form of adaptability is implied by the term module itself. Each module is intended to have an "accordion-like" quality so that, while each is a complete "package" entailing about five hours of instruction, sections can be selected, at the discretion of the group leader, depending upon: (1) needs of the participants, and (2) time availability. The module is also adaptable in the sense that it can be used for individual self-instruction as well as group instruction by a leader.

Other criteria employed in developing and refining the modules were:

- The **goals** for the module are clear to the leader and to the participants.
- Each **activity** is congruent with the objective with which it is associated.
- The module is, insofar as possible, **self-contained and self-sufficient** — that is, all needed materials are provided or readily available.
- **Terms** are appropriately used and clearly defined.
- The module is designed to hold the **interest and motivation** of those using it.

For each objective, a matrix identifies enabling activities, resources for use in conducting these activities, and leader notes (suggestions, possible supplemental materials, etc.). The following example of a matrix from one module is representative of this plan of organization and illustrates how resources and notes are linked to activities.

LEVEL: STAFF

GOAL: Comprehend the significance of play in the development of young children.

COMPETENCY TYPE: KNOWLEDGE

OBJECTIVE: Participants will understand (recognize) the relationship between play and the developing child.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
10. Discuss stages of play that children experience as viewed by several theorists. – Mildred Parten – Piaget – Sara Smilansky – Others	10. Use Handouts *Mildred Parten's Developmental Stages of Social Play* *Piaget's Theory of Play* *Sara Smilansky* *Others*	10. Read Chapter 11, *Teaching Infants and Preschoolers with Handicaps* by Bailey and Wolery. Read *Special Needs: Play and Learning.* Also read *Play As A Medium for Learning & Development. A Handbook of Theory and Practice* by Bergen.
11. Review *Four Trends Pertinent to Play.*	11. Use Transparency *Four Trends*	11. Read and study leader notes, *Four Trends Pertinent to Play.*
12. Review stages of cognitive play.	12. Use Handout *Stages of Cognitive Play*	12. Cognitive play is used here as one example. If time permits, other domains could be discussed.
13. Review the way play can contribute to the preschool child's overall development.	13. Use Transparencies *As Adults* *All people ...*	13. Read Chapter 11, *Teaching Infants and Preschoolers with Handicaps* by Bailey and Wolery. Read Section 2 in *Play As A Medium for Learning and Development* by Bergen.

Enabling Activities — This column lists the recommended activities that will lead to the accomplishments of the objectives.

Resources — The materials listed in this column are those needed to complete the recommended activities

Leader Notes — Special recommendations to the in-service leader on conducting the suggested activities are provided in this column.

MULTI-STAGE PROCESS OF DEVELOPMENT AND REVIEW

Having identified their respective topics, the teams developed their modules during the 1990-91 school year, sharing progress reports at a series of planning meetings. This stage culminated in more formal presentations of the "work-in-progress" to members of all module development teams, Project Prepare staff, and a Reactor Panel. Comments and suggestions elicited through this process were incorporated in feedback meetings of the Reactor Panel with each team.

Throughout the 1991-92 school year, a two-stage field test procedure was implemented. First, each team presented a five-hour training session of their module at a primary training site. Evaluation data obtained from these sessions included feedback from the leaders, the participants, and also an invitational group of observers. Observers included steering committee members, members of other teams, and project coordinating staff. Participants in each primary training session were given the opportunity to participate in secondary training, that is, to conduct a five-hour training session using any of the nine modules, providing similar evaluation data. A total of 18 secondary training sessions were held. The results of the primary and secondary training yielded data used in considering modifications.

Overall, both participants and leaders who supplied feedback on the field test sessions were very positive about the training and materials. A total of 484 surveys were completed by in-service participants. Those who responded represented individuals from diversely populated areas: rural (37%), urban (16%), urban and suburban (14%), rural, urban and suburban (14%), suburban (8%), and rural and urban (7%). Almost all (98%) felt that the activities presented at their sessions related to the in-service topic. A similar response was found for consistency with philosophical premises. Most believed that the in-service training was consistent with developmentally appropriate practice (98%), exceptionality appropriate practice (90%), integration (91%), and family and professional collaboration (93%). The majority of those who did not respond positively to these items on consistancy "did not know" whether or not there was consistency.

The greatest amount of disagreement was found on the item which asked whether the training was sensitive to multicultural issues. Seventy two percent of those responding indicated "yes," while 16% said "no" and 16% "did not know." As a result of this feedback the issue of sensitivity to diversity was strengthened in the materials during the final revision.

Additional positive feedback from participants showed that 93% felt that activities were appropriate for the audience, 96% believed the interest level was acceptable or terrific and 95% would recommend the training to others. No significant differences were found among responses from different types of audience participants (i.e., teachers, psychologists, parents, etc.) or among groups from varied populations (i.e., urban, rural, suburban, etc.).

The feedback provided by the 21 in-service leaders who completed response surveys was quite similar to that shared by the participants. Most (91%) felt that the materials allowed them to meet their objectives and that activities related to the goals stated in the modules. Almost all believed that the materials were consistent with developmentally appropriate practice (95%), exceptionality appropriate practice (95%), integration (94%), and family and professional collaboration (95%). Sixty three percent of the leaders responding believed that the materials were also sensitive to multicultural issues, while 31% "did not know," and 5% felt that they did not adequately address this premise. As stated above, this information was used to identify and make needed revisions.

In addition, most leaders (88%) found the activities to be appropriate for all audience participants and that materials were designed to accommodate various audiences (91%). All (100%) found the interest level to be acceptable or terrific. Seventy five percent of the leaders noted that all required materials were provided and 95% believed that module materials could be used for in-service training sessions that varied in length (i.e., amount of time).

In regard to the use of the modules by leaders, most found them easy to use (95%), well organized (84%), to have clear directions (94%), and to have clear (100%), and complete (89%) leader notes. Minor revisions were made following the field test to increase these charateristics in the set.

Strong support by the leaders for the competency-based modules was found in the fact that all (100%) reported that they would use the same module again and many (89%) said that they would use other modules in the set. Finally, all leaders (100%) indicated that they would recommend the modules to other professionals who conduct in-service training.

Each module development team having made every effort to insure that their product satisfied each of the basic criteria, then used the feedback to refine and modify their final product. During the entire process each module was subjected to conscientious and detailed peer review. Directives ranged from minor editorial changes to significant and substantive additions, deletions, and reworkings. Team cooperation and genuine enthusiasm was evident throughout the entire process, as was their creativity, resourcefulness, thoroughness, and skill. Their efforts combined with the expertise and conscientious work of the Project's Steering Committee, cross-module review teams, the Reactor Panel, internal and external expert reviewers, and the Project Consistency/Finalization Task Force made for a truly collaborative project and a total quality product.

PROJECT PREPARE

Module Introduction

Applications of Technology for Young Children with Disabilties

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ABSTRACT

While all young children have an inherent desire to play, explore and manipulate objects, and interact with others in their environments, young children with disabilities may be unable to attain these basic skills in traditional ways. All children need interaction within their physical and social environments. Without effective means of interaction, these natural desires to explore and learn often become quickly diminished. The child, then, may demonstrate helplessness, passivity, and frustration.

While technological interventions play an important role in all early childhood classrooms, they are especially critical for those young children who otherwise have little way to effect change in their environments. With the addition of a switch to activate a toy or provide input to a computer, a child with physical limitations can actively participate in his or her environment. Use of an augmentative communication system allows the child with severe communication difficulties to express wants and desires within play activities. In order to provide successful experiences within a child's play development, technological applications must be developed within a transdisciplinary team approach and be fully integrated within the child's normal activities. Parent participation within the process of implementing technological application is critical to the overall success of the intervention and the later transfer of the application into other settings. Assessment of social or cultural differences which may bear on the process yields important information for the transdisciplinary planning process.

With a means of interaction and ability to effect change, the child's interest in further exploration of his environment is stimulated. With the introduction of assistive technology within the curriculum, a foundation for further learning and goal attainment may be established. (Robinson, 1986).

OVERVIEW

This module provides opportunity for general, staff, and administrative training for the purpose of establishing greater degrees of knowledge, skill, and sense of appreciation of the critical importance of applying assistive technology within educational service delivery for young children with disabilities. The module is designed to provide an *introductory* experience in various areas of assistive technology and is *not* intended to produce proficient users! It is suggested that the leader provide specific information and resources regarding further training opportunities for more intensive exploration of the topics introduced.

Given the critical need for greater awareness regarding successful integration of electronic and computer applications within an environment for young children, this module primarily addresses the appropriate use of these relatively "high tech" applications. *It is highly suggested however, that the module be utilized only within a perspective which openly acknowledges the critical importance of "low tech" modification strategies within a child's learning environment prior to or in conjunction with consideration of such "high tech" solutions.* Given that Apple II computers are presently the primary type found in public schools, this module has been designed within a Apple II framework. With Macintosh and IBM presently entering the preschool educational arena to greater degrees, a leader may need to adapt Goals 3 and 4 to reflect an alternate computer focus. Technical information regarding appropriate software and the compatibility of peripherals with Mac and IBM could be gained from the appropriate manufacturer(s) as listed within the module information, or sought from the local SERRC technology contact person. Issues dealing with integration methods in Goal 4 would remain highly appropriate regardless of computer choice.

Leaders utilizing the materials with General audiences will primarily provide awareness experiences. At the Staff level, activities are designed to encourage greater levels of realization of developmental benefits for young children when assistive technology is successfully integrated. Finally, activities at the Administrative level are designed to more carefully examine issues from a programmatic perspective and should encourage greater awareness of the benefits for *all* children when assistive technology is utilized.

In the spirit of the above context, six goals have been established as follows:

1. **Gain an overview of assistive technology and its integral role within curricular strategies for young children with disabilities.**
2. **Become familiar with switch applications as means of allowing young children greater opportunities for independent control and participation.**
3. **Gain introduction to basic use of computers and peripherals.**
4. **Explore how applications of computers and peripherals can be successfully integrated within the curriculum.**
5. **Gain an overview of augmentative/alternative communication (AAC) systems for young children with severe communication difficulties.**
6. **Gain practical information regarding obtaining funding for assistive technology devices and services.**

Finally, the writers of this module wish to acknowledge two primary training materials which have been integrated within the compilation of this module: *Preschool Integration Through Technology* (Mistrett, S., Raimondi, S., and Barnett, M.; UCP of Western New York, Inc.) and *ACTTive Futures: ACTT's Curriculum Guide for Young Children and Technology* (Huntinger, P., Clark, L., Flannery, B., Johanson, J., Lawson, K., Perry, L., Robinson, L., Schneider, C., and Whitaker, K.; Macomb Projects, Western Illinois University). While these original training materials are strongly suggested as resources, they are not necessary for the successful implementation of this module. Those individuals who are interested in more comprehensive training information should contact their local SERRC centers or Ohio Resource Center for Low Incidence and Severe Handicaps (ORCLISH) for these and other valuable resources, as well as the assistance of appropriate SERRC personnel.

GOALS

The goals for this module are as follows:

1. Gain an overview of assistive technology and its integral role within curricular strategies for young children with disabilities.
2. Become familiar with switch application as a means of allowing young children with disabilities greater opportunity for independent control and participation.
3. Gain introduction to basic use of computer and peripherals with young children who have disabilities.
4. Explore how application of computers and peripherals can be successfully integrated within a curriculum for young children with special needs.
5. Gain an overview of augmentative/alternative communication (AAC) system as a means of meeting the needs of young children with severe communication difficulities.
6. Gain practical information regarding obtaining funding for assistive technology devices and services.

GOAL #1 Gain an overview of assistive technology and its integral role within curricular strategies for young children with disabilities.

AUDIENCES

	GENERAL	STAFF	ADMINISTRATOR
Competency Component	Recognize important benefits for young children when assistive technology is used in the preschool setting.	Recognize the importance of assistive technology in the delivery of developmentally appropriate curriculum for young children with disabilities.	Recognize positive developmental implications for all young children when assistive technology is utilized and explore methods of facilitating family involvement.
Knowledge Objectives	Participants will become familiar with several ways technology can impact the lives of young children with disabilities.	Participants will become familiar with several ways technology can impact the lives of young children with disabilities.	Participants will become familiar with several ways technology can impact the lives of young children with disabilities.
Skill Objectives	Given a case study, participants will identify ways that technology could impact the life of a young child with a disability.	Given a case study, participants will identify ways that technology could impact the life of a young child with a disability.	Participants will explore issues relating to family involvement in the implementation of assistive technology.
Attitude Objectives	Participants will develop an appreciation of the ability of technology to enable young children with disabilities to perform developmentally appropriate activities.	Participants will develop an appreciation of the ability of technology to enable young children with disabilities to perform developmentally appropriate activities.	Participants will explore methods of facilitating family involvement in the application of assistive technology.

GOAL #2 Become familiar with switch application as a means of allowing young children with disabilities greater opportunities for independent control and participation.

AUDIENCES

	GENERAL	STAFF	ADMINISTRATOR
Competency Component	Become familiar with ways that switches can be used to provide young children greater opportunities to control their environments.	Become familiar with ways that switches might be used in the classroom to provide young children greater opportunities for independent control and participation in curricular activities.	Recognize positive benefits for all young children when switch application is used to provide equal opportunities for curricular participation.
Knowledge Objectives	Participants will learn about types of switches and interfaces and why they are used.	Participants will learn about types of switches and interfaces and why they are used.	Participants will learn about types of switches and interfaces and why they are used.
Skill Objectives	Participants will operate toys and appliances adapted for switch use and identify sources for these materials.	Participants will operate toys and appliances adapted for switch use and identify sources for these materials.	Participants will operate toys and appliances adapted for switch use and identify sources for these materials.
Attitude Objectives	Participants will identify positive benefits of switch use for young children with physical or cognitive limitations.	Participants will identify positive benefits of switch use for young children with physical or cognitive limitations.	Participants will explore methods of using switch application to effectively integrate children with special needs within regular curricular activities.

GOAL #3 Gain introduction to basic use of computer and peripherals with young children with disabilities.

AUDIENCES

	GENERAL	STAFF	ADMINISTRATOR
Competency Component	Gain awareness of ways that computers can be adapted for use by young children with special needs.	Become familiar with specific ways the computer can be adapted to meet individual learning needs of young children with disabilities.	Recognize positive benefits for all young children when adapted computer application is used to provide equal opportunities for curricular participation.
Knowledge Objectives	Participants will learn that the computer and peripherals can be used in various ways to meet the individual needs of young children with special needs.	Participants will learn that the computer and peripherals can be used in various ways to meet the individual needs of young children with special needs.	Participants will learn that the computer and peripherals can be used in various ways to meet the individual needs of young children with special needs.
Skill Objectives	Participants will identify computer components and peripherals.	Participants will identify and use computer components and peripherals.	Participants will identify computer components and peripherals.
Attitude Objectives	Participants will see the computer and peripherals as effective tools and understand that for some children, their use may provide the only means for participation in ongoing curricular activities.	Participants will see the computer and peripherals as effective tools and understand that for some children, their use may provide the only means for participation in ongoing curricular activities.	Participants will see the computer and peripherals as effective tools and understand that for some children, their use may provide the only means for participation in ongoing curricular activities.

GOAL #4 Explore how applications of computers and peripherals can be successfully integrated within a curriculum for young children with special needs.

AUDIENCES

	GENERAL	STAFF	ADMINISTRATOR
Competency Component	Recognize adapted computer application as a tool for meeting individual instructional goals of young children with special needs.	Learn specific strategies for using adapted computer activities to achieve ongoing curricular goals.	Recognize positive benefits for all young children when adapted computer applications are fully integrated within the ongoing curriculum.
Knowledge Objectives	Having viewed several examples via tape and demonstration, participants will list and discuss ways that computer applications can be integrated within the ongoing preschool curriculum.	Having viewed several examples via tape and demonstration, participants will list and discuss ways that computer applications can be integrated within the ongoing preschool curriculum.	Having viewed several examples via tape and demonstration, participants will list and discuss ways that computer applications can be integrated within the ongoing preschool curriculum.
Skill Objectives	Participants will use an early childhood software program and utilize appropriate steps to identify ways it could be used to meet a child's needs within a preschool curriculum.	Participants will use an early childhood software program and utilize appropriate steps to design activities for effectively integrating its use within the curriculum.	Participants will use an early childhood software program and utilize appropriate steps to identify ways it could be used to meet a child's needs within a preschool curriculum.
Attitude Objectives	Participants will appreciate the positive benefits experienced by young children with special needs when computer applications are fully integrated within the early childhood curriculum.	Participants will appreciate the positive benefits experienced by young children with special needs when computer applications are fully integrated within the early childhood curriculum.	Participants will appreciate the positive benefits experienced by young children with special needs when computer applications are fully integrated within the early childhood curriculum.

GOAL #5 Gain an overview of augmentative/alternative communication (AAC) systems as a means of meeting the needs of young children with severe communication difficulties.

AUDIENCES

	GENERAL	STAFF	ADMINISTRATOR
Competency Component	Develop a general awareness that young children with severe communication difficulties can be aided by an appropriate AAC system.	Gain familiarity with specific ways AAC systems can promote communication and interaction for young children with severe communication difficulties.	Recognize developmental and programmatic advantages which exist when AAC systems are available to ensure that all young children have a means of communication and interaction.
Knowledge Objectives	Participants will learn and discuss specific ways AAC systems assist young children in meeting their communication needs.	Participants will learn and discuss specific ways AAC systems assist young children in meeting their communication needs.	Participants will learn and discuss specific ways AAC systems assist young children in meeting their communication needs.
Skill Objectives	Participants will identify specific advantages for young children who utilize AAC systems.	Participants will utilize an AAC device to store and send simple messages.	Participants will identify specific advantages for young children who utilize AAC systems.
Attitude Objectives	Participants will develop an appreciation of the critical need on the part of young children with severe communication difficulties to have access to appropriate and functional AAC systems.	Participants will develop an appreciation of the critical need on the part of young children with severe communication difficulties to have access to appropriate and functional AAC systems.	Participants will explore strategies for using AAC systems in effectively integrating children with severe communication difficulties within typical curricular activities.

GOAL #6 Gain practical information regarding obtaining funding for assistive technololgy devices and services.

AUDIENCES

	GENERAL	STAFF	ADMINISTRATOR
Competency Component	Become aware of basic sources and strategies used in obtaining funding for assistive technology.	Become able communicators with parents and other child advocates on sources and strategies used in obtaining funding for assistive technology.	Gain awareness of funding sources and the local school district's degree of responsibility for provision of assistive technology, as interpreted within current special education federal mandates.
Knowledge Objectives	Participants will become familiar with a four-step process for seeking and obtaining funding, several primary sources of funding, and key strategies.	Participants will become familiar with a four-step process for seeking and obtaining funding, several primary sources of funding, and key strategies.	Participants will become familiar with a four-step process for seeking and obtaining funding, several primary sources of funding, and key strategies.
Skill Objectives	Participants will recognize and discuss considerations of the funding process unique to preschool-aged children.	Participants will recognize and discuss considerations of the funding process unique to preschool-aged children.	Participants will review and discuss school districts level of responsibility for provision of assistive technology devices and services as interpreted within current federal special education mandates.
Attitude Objectives	Participants will appreciate that funding for the best solution *is* always available — the necessary ingredients are PATIENCE and PERSISTENCE.	Participants will appreciate that funding for the best solution *is* always available — the necessary ingredients are PATIENCE and PERSISTENCE.	Participants will appreciate that funding for the best solution *is* always available — the necessary ingredients are PATIENCE and PERSISTENCE.

GLOSSARY

Adapt: Changing or modifying the time (schedule), space, materials, or expectations of the environment to better meet the needs of an individual child or class.

Adaptive behavior: Addresses self-help, independent functioning, and personal and social responsibility as is appropriate for a same-age peer and according to one's cultural group.

Adaptive computer access: Use of an alternative input device for the computer which gives the student with disabilities an alternate means of access when the regular keyboard may not be appropriate. These include expanded keyboards, switches, touch windows, joysticks, and voice input.

Adaptive firmware card: A special card placed inside the Apple computer which allows transparent access to commercial software by any one of 16 input methods, including scanning, Morse code, expanded keyboards, and adaptive keys.

Adaptive keyboard: An alternative keyboard usually attached to the computer with an adaptive firmware card. Adaptive keyboards are generally programmable and allow the student to send information to the computer in the most efficient form based on individual needs.

Age appropriate: Experiences and/or a learning environment that support predictable growth and development in the physical, social, emotional, and cognitive domains that are typical for children at specific chronological ages.

Anecodotal records: A brief account of a situation that provides a factual description of an incident, behavior, or event.

ANSI: American National Standards Institutes: Institute which adopted a standard for the threshold of normal hearing.

Anti-bias curriculum: Developmentally appropriate materials and equipment which project an active/activist approach to challenging prejudice, sterotyping, bias, and "isms."

Appropriate environment: Surroundings that are suited to both the age and the individuality of all children present.

Appropriate practice: Techniques or a style used with young children that is age and individually appropriate.

Assertive: To maintain or defend rights without being hostile or passive.

Assessment: The collection of information through different types of procedures such as criterion-referenced tools, norm-referenced tools, observation, interviews, and anecdotal records.

Assistive device: Any specific aid, tool, or piece of equipment used to assist a student with a disability.

Associative play: A type of play in which a child plays with others in a group and subordinates his/her individual interest to the interests of the group.

At-risk: Students that have a greater chance of experiencing difficulties developmentally or at school due to social, economic, environmental, or biological factors.

Augmentative and alternative communication (AAC): An integrated group of symbols, aids, strategies, and techniques used by a student to enhance communication abilities. The system serves to supplement the student's gestural, spoken and/or written communication abilities. AAC strategies include the full range of approaches from "low tech" concrete and symbolic ones to "high tech" electronic voice out-put systems.

Battery device adaptor: Adaptation which allows a battery-operated device to be activated by a switch.

Boot: The process of turning the computer on and loading a program into memory.

Byte: The area of storage needed for storing a single character of the alphabet in memory. One thousand twenty four bytes are equivalent to one K of memory. One byte is made up of eight on/off electronic impulses called "bits." Knowing how much memory is available on your computer will ensure appropriate planning for software selection.

Categorical orientation: A philosophical approach to assessment designed to yield a diagnostic label; labeling a child according to some presumably underlying condition (e.g., learning disability, mental retardation, or behavior disorder).

Center-based services: Educational services that are provided at a central location, typically through a classroom type format.

Character: Refers to any letter, number, punctuation mark, or space used to represent information on the computer.

Child-initiated activity: An activity selected by a child with little or no intervention by another child or adult.

Close-ended materials: Materials that have one or two ways in which children can play with them and which offer few opportunities for creativity and experimentation.

Cognition: Application of intellect as opposed to feelings/affect in mental processes.

Collaboration: Interaction between people to solve a problem; working and sharing together for a common goal.

Collaborative: A group of agencies and parents working together to ensure quality services for young children with disabilities.

Communication skills: Receptive and expressive language, facial expressions, body language, gestures, etc. that allow a child to respond across settings.

Computer: It is the processing unit, memory, and power supply source of the computer system. Attached to the computer are the monitor, the input device (e.g., keyboard), and the disk drive. [Also called the central processing unit (C.P.U.).]

Computer assisted instruction (CAI): Refers to all instruction which is conducted or augmented by a computer. CAI software can target the full range of early childhood curricular goals, with formats that include simple exploration, educational games, practice, and problems solving.

Computer switch interface: Device which allows single switch access to a computer.

Constructive play: Play in which a child purposefully manipulates materials in order to build structures and produce novel or conventional creations.

Control unit: The unit that enables electrical devices to be activated by a switch.

Cooperative play: Play in which a child plays with other children in activities organized to achieve a common goal, may include interactive dramatic play or formal games.

Co-playing: Occurs when an adult joins in an ongoing play episode but lets the children control the course of the play.

Criterion-referenced tests: Evaluation tools which are specifically constructed to evaluate a person's performance level in relation to some standard.

Curriculum-based assessment: An assessment of a child's abilities or behaviors in the context of a predetermined sequence of curriculum objectives.

Cursor: The small blinking symbol on the monitor which indicates that the computer is waiting to receive information.

Dedicated device: A device containing a computer processor dedicated strictly to processing and producing voice output.

Developmental: Having to do with the typical steps or stages in growth and development before the age of 18.

Developmentally appropriate: The extent to which knowledge of child development is applied in program practices through a concrete, play oriented approach to early childhood education. It includes the concepts of age and individual appropriateness.

Developmentally appropriate curriculum: A curriculum planned to be appropriate for the age span of the children within the group and is implemented with attention to individual and differing needs, interests, and skills of the children.

Developmentally appropriate practice (DAP): Curriculum which is appropriate to the age and individual needs of children.

Differentiated referral: Procedures for planning, implementing, and evaluating interventions which are conducted prior to referral for multifactored evaluation.

Digitized speech: Speech that is produced from prerecorded speech samples. While digitized speech tends to be more intelligible and of higher quality than synthesized speech other factors such as the speaker system play into the overall effect.

Direct selection: A selection which is made on a computer through either a direct key press or use of a light to directly point to the desired key.

Discrepancy analysis: A systematic assessment process in which skills required for a task are identified and compared to a child's current skills to determine the skills that need to be taught or for which adaptations need to be made.

Disk: The item used to store computer programs. [Also known as a diskette or floppy disk.]

Disk drive: Component of computer system which reads program information stored on disk.

Documented deficit: Area of development or functioning for a child that has been determined to be delayed based on data obtained through structured interview, structured observation, norm-referenced and criterion-referenced/curriculum-based assessments.

Domain-referenced tests: Evaluation instruments which emphasize the person's performance concerning a well-defined level or body of knowledge.

Dramatic play: Play in which a child uses objects in a pretend or representational manner. [Also called symbolic play.]

Eligibility: Determination of whether a child meets the criteria to receive special education services.

Evaluation: A comprehensive term which includes screening, assessment, and monitoring activities.

Event Sampling: A type of systematic observation and recording of behaviors along with the conditions that preceded and followed them.

Expanded keyboard: Larger adapted keyboards that replace the standard keyboard for a child whose motor control does not allow an efficient use of a regular keyboard. With the use of special interfaces, the size and definition of the keys can be alterd based on the needs of the child.

Expectations: The level of behavior, skill, and participation expected within the classroom environment.

Exploratory play: Play in which a child learns about herself and her world through sensory motor awareness and involvement in action, movement, color, texture, and sound. Child explores objects and the environment to find out what they are about.

Family: Parents and their children; a group of persons connected by blood or marriage; a group of persons forming a household.

Fixed vocabulary: Vocabulary that has been pre-programmed by the manufacturer within a communication device. In some cases it can be altered. In other cases, revisions must be submitted to the manufacturer for re-programming.

Formative evaluation: The collection of evaluation data for the purpose of supporting decisions about the initial and ongoing development of a program.

Functional approach: A philosophical orientation to assessment and curriculum which seeks to define a child's proficiency in critical skills necessary for the child to be successful at home, at school, in the community, etc.

Functional play: Play in which a child repeats simple muscular movements or utterances. The repetitive action provides practice and allows for exploration.

Funding advocate: Individual who assumes critical role of developing a funding strategy, pursuing appropriate sources and patiently advocating on behalf of the child until funds are procured.

Funding strategy: A methodical play developed by the funding advocate for procuring funding which is based on a determination of unique individual needs and an understanding of the resources and requirements of appropriate systems.

Generalization: The integration of newly-acquired information and the application of it to new situations.

Graphics: Pictures and other visual information generated by the computer.

Grief: Reaction to loss; feelings parents may experience when confronted with information about their child's disability.

Hardware: Refers to all electronic and mechanical components making up the computer system, including the computer, monitor, disk drive, printer, and peripherals.

I.D.E.A.: Individuals with Disabilities Education Act.

Identification: The process of locating and identifying children who are eligible for special education services.

Imaginative play: Play in which a child uses toys or objects for imitation, role-playing, and pretending.

Incidental learning: Information learned in the course of play and other informal activities without the need for any specific teaching.

Individual appropriateness: Experiences that match each child's unique pattern of growth, personality, learning style, and family/cultural background.

Individual Family Service Plan (IFSP): A written plan for an infant or toddler developed jointly by the family and appropriate qualified personnel.

Individualized Education Program (IEP): A written education plan for a preschool or school-aged child with disabilities between the ages of three and 21 which is developed by a professional team and the child's parents.

Informal tests: Measures that are not standardized and are developed to assess children's learning in a particular area.

Initialize: A necessary process for preparing a computer disk to store information for the first time. Any information on the disk will be erased when the disk is initialized.

Input device: Any component or peripheral device which enables the child to input information to the computer. While the keyboard is the most common, other input devices include switches, adapative keyboads, joysticks, power pads, and touch windows.

Integrated preschool: A preschool class that serves children with disabilities and typically developing peers in the same setting.

Integration: Participation of children with disabilities in regular classroom settings with typically developing children.

Integration (of technology): A process in which assistive technology is effectively utilized to provide a child who has disabilities equal opportunity to participate in ongoing curricular activities. It involves using technology to augment internal capabilities in the accomplishment of desired outcomes in academic, social, domestic, and community settings and involves awareness-building on the part of all staff and peers.

Interdisciplinary: A model of team organization characterized by professionals from several disciplines who work together to design, implement, and document goals for an individual child. Expertise and techniques are shared among the team so all members can assist the child in all domains; all members assess or provide direct service to the child.

Interface: A connection between a computer and an add-on peripheral device.

Interface card: A circuit board which can be inserted into one of the expansion slots to add specific capabilities to the computer. Examples are Adaptive Firmware Card™ or Echo™.

Interpersonal communication: Communication with others.

Intrapersonal communication: Communication with oneself.

I/O game port: Ports located on or in the computer that allow the user to plug in peripheral devices.

Itinerant services: Services provided by preschool special education teachers or related services personnel which occur in the setting where the child or the child and parent(s) are located as opposed to providing services at a centralized location.

Joy stick: An input device for the computer which has a control stick and two buttons. Rotating the stick moves the cursor in a circle. Pressing the buttons can control other program features.

K: Stands for kilo or 1,000 (actually 1,024) bytes of memory. A computer with 64K has storage for 64 kilobytes of data.

Keyguard: A plastic or metal sheet with finger-sized holes that covers a standard or alternative keyboard to help children who have poor motor control to select the desired keys.

LEA (Local Education Agency): The public school district which is responsible for a student's education.

Leaf switch: Flexible switch that is activated when bent or gently pressed.

Least restrictive environment (LRE): To the maximum extend appropriate, children with disabilities, including children in public or private institutions or other care facilities, are educated with children who are not disabled, and that special classes, separate schooling, or other removal of children with disabilities from the regular educational environment occurs only when the nature or severity of the disability is such that education in regular classes with the use of supplementary aids and services cannot be achieved satisfactorily.

Manipulative play: Play in which a child acts upon objects in order to physically explore and control the objects.

Mask: A cardboard or plastic device that is placed over keyboard sections on a computer or communication device to block out unnecessary keys and assist the child in focusing on the target keys for a particular function.

Maximize: Making maximal use of the materials and environmental cues readily available in the typical early childhood environment in order to enhance the participation skills of children with disabilities within that classroom setting.

Megabyte: A unit of measure for computer memory. One megabyte equals 1,048,576 bytes or characters.

Memory: Computer chips which have the capacity to store information. Information stored in Read Only Memory (ROM) is stored permanently for the computer and cannot be erased. Random Access memory (RAM) is a temporary storage area for programs and data. RAM is erased when the computer is turned off and therefore must be stored on a disk or hard disk drive.

Mercury (tilt) switch: Gravity sensitive switch which activates when tilted beyond a certain point.

Modem: A peripheral device which allows a computer to send and receive data from another computer over the telephone lines.

Monitor: A screen which provides a visual display of the information being processed by the computer.

Motor planning: The discovery and execution of a sequence of new, non-habitual movements. Examples: Climbing through an unfamiliar obstacle course, learning to remove a sweatshirt or to tie a bow. Once the sequence is learned, it does not require motor planning to repeat it.

Mouse: A computer device that controls the pointer on the monitor. By clicking a mouse, a child can provide input to the computer.

Multifactored assessment: An evaluation of more than one area of a child's functioning so that no single procedure shall be the sole criterion for determining an appropriate educational decision. Such an evaluation includes professional staff from many disciplines.

Multidisciplinary; A model of team organization characterized by professionals from several discipines working independently who relate information concerning their work with an individual child to each other but do not coordinate, practice, or design a total educational program together.

Muppet learning keys: A touch sensitive keyboard designed specially for use with children. Letters and numbers are arranged in sequence, and keys are marked with colorful Muppet characters.

Norm-referenced tests: Tests that compare the performance of an individual against a group average or norm. Such tests often utilize standard scores, percentile ranks, age equivalencies, or developmental quotients.

Object permanence: The recognition of the existence of objects by children even after all or part of it is out of sight. Peek-a-boo is an early game to help baby begin to develop object permanence.

Observation: To take notice or pay attention to what children say and do in order to gather and record information for the purpose of interacting more effectively with them.

Open-ended materials: Materials which offer a wide range of opportunities for creativity and experimentation and that do not have just one or two ways in which a child can play with them.

Output: Any information that is transferred from the computer to another device such as a printer or speaker.

Output device: Any device that receives information from the computer and makes it available to the child in an understandable form. Output devices include monitors, printers, and speech synthesizers.

Overlay: Paper or plastic sheet which fits over a computer keyboard or electronic communication device containing symbols or icons depicting the information stored in the active areas below.

Parallel play: A situation in which a child plays independently with materials similar to those used by children playing in close proximity. Social contact is minimal.

Peer-initiated acitivity: A child becomes involved in an activity following the observation of a peer engaged in play or through invitation by that peer.

Peripheral: Any hardware device which is outside, but connected to, the computer. Peripherals include input and output devices such as joysticks, touch windows, adaptive keyboards, speech synthesizers, and printers.

Physical play: Action that is frequently social, may be competitive, and includes rough-and-tumble activities.

Plate switch: The most common type of switch. Downward pressure on plate causes circuit to be completed and connected object will be activated.

Play: Freely chosen, spontaneous, and enjoyable activities which assist in organizing cognitive learning, socialization, physical development, communication, etc.

Play-based assessment: Assessing children in a natural play-oriented setting as opposed to a traditional assessment environment in which the examiner controls the child's behavior through standardized testing procedures.

Play tutoring: An adult initiates a new play episode taking a dominant role and teaching the child new play behaviors.

Port: A socket on the back panel or on the logic board of the computer for connecting peripheral devices.

Power pad: A touch sensitive pad used as an alternate means of accessing the computer. Overlays define press areas necessary to activate special software programs.

Practice play: Involves the child's pleasurable repetition of skills that have been previously mastered.

Pressure sensitivity: Refers to the amount or degree of touch sensitivity required to activate a device.

Preventative approach to managing behavior: Adults set the stage for an environment that is child-centered, based on developmentally appropriate activities, expectations, and techniques, and organized to address positive discipline.

Printer: The device which produces a printed "hard copy" of the text or graphics from the computer.

Program: A set of instructions for the computer which allows it to carry out a specific function or task.

Programmable vocabulary: Refers to communication devices that can be programmed on site, as opposed to being returned to the manufacturer for programming.

Public domain software: Programs which are not copyrighted and are available for copying.

Public Law 94-142: A law passed in 1975 requiring that public schools provide a "free, appropriate public education" to school-aged children regardless of handicapping conditions (also called the Education of the Handicapped Act).

Public Law 99-457: *The Education of the Handicapped Act Amendments of 1986.* This law mandated services for preschoolers with disabilities and established the Part H program to assist states in the development of a comprehensive, multi-disciplinary, and statewide system of early intervention services for infants and toddlers (birth to age three).

Public Law 101-476: *The Education of the Handicapped Act Amendments of 1990.* This law changed the name of EHA to the Individuals with Disabilities Education Act (I.D.E.A.). The law reauthorized and expanded the discretionary programs, mandated that transition services and assistive technology services be included in a child's or youth's IEP, and added autism and traumatic brain injury to the list of categories of children and youth eligible for special education and related services among other things.

Pure-tone hearing test: Test that detects hearing loss using pure tones (frequencies) varing from 250 Hz to 8,000 Hz. This is the range that includes most speech sounds.

Rating scales: Tests used in making an estimate of a child's specific behaviors or traits.

Reliability: A measure of whether a test consistently measures what it was designed to measure. The focus is on consistency.

Role release: Mutual sharing of knowledge and expertise by professionals on a team in order to enhance service delivery to the child and family which enables each team member to carryout responsibilities traditionally assigned to another member of the team.

Running record: A narrative description involving a record of a child's behavior and relevant effects for a period of time.

Scanning: A process by which a range of possible responses is automatically stepped through. To select a response, the child activates the switch at the desired selection.

Screening: A process of identifying and referring children who may have early intervention needs for further assessment.

Self-control: The voluntary and internal regulation of behavior.

Shareware: Public domain software available for trial use prior to purchase.

Sip 'n puff: A type of switch which is activated by sipping or puffing on tubing.

Social competence: The ability of a child to interact in a socially acceptable and developmentally appropriate manner.

Software: The programs used by the computer which are available on both 3.5" and 5.25" disks.

Solitary play: A situation in which a child plays alone and independently with materials different from those used by children playing in close proximity. No social contact occurs.

Speech synthesizer: An output device which converts electronic text characters into artifical speech. A circuit card interfaces the computer and speaker, enabling the production of "spoken" output.

Standardized tests: Tests which include a fixed set of times that are carefully developed to evaluate a child's skills or abilities and allow comparison against a group average or norm.

Structured interview: An interview employing carefully selected questions or topics of discussion.

Structured observation: A situation in which the observer utilizes a predetermined system for recording child behaviors; also referred to as a systematic observation.

Structured play: Carefully planned activities with specific goals for adult/child, child/child, or child/materials interaction.

Summative evaluation: Evaluation strategies designed to measure program effectiveness.

Switch: A device that can be used to control an electronic object. A switch can be used as an alternative means of accessing an electronic toy or appliance, communication system, mobility device, or computer.

Switch interface: A connection between a switch and the object being controlled. A timer is an interface used to control how long the item will remain turned "on."

Switch latch interface: An interface which turns a device on and then off with each switch activation.

Symbolic play: Play in which a child uses one object to represent or symbolize another.

Synthesized speech: Speech that is produced by blending a limited number of sound segments. Because it is simply a combination of established sounds, it tends to sound robotic.

Systematic intervention: An approach which utilizes data collection to determine the effectiveness of the intervention.

Systematic observation: See "Structured Observation."

Tactile: Having to do with the sense of touch.

Teacher-directed activity: An activity in which the adult initiates and continues to supervise children's play. This type of supervision can be used to direct children, help them learn to initiate and attend to an activity, and to provide reinforcement for their participation.

Teacher-initiated activity: One in which the adult brings attention to an activity, but withdraws as children become involved and play on their own.

Time sampling: A type of systematic observation whereby tallies are used to indicate the presence or absence of specified behaviors over short periods of time.

Touch window: A touch sensitive screen designed as an alternative means of accessing the computer. The child simply touches the screen (attached to the monitor) to provide input to special computer programs.

Transdisciplinary: An effective team approach to IEP development and problem-solving which involves "role release" on the part of the team members resulting in problem-solving through a mutual sharing of all disciplinary perspectives. One professional is assigned the role of "primary" service provider.

Typically developing child: A child who is not identified as having a disability.

Unicorn keyboard: An alternative computer keyboard for use when a standard keyboard may not be accessable; 128 one-inch square keys can be redefined to create larger areas to accommodate the physicial capabilities of the child.

Unidisciplinary: Professionals from various disciplines (education, speech, motor, etc.) provide intervention services to the same child with little or no contact or consultation among themselves.

Unstructured play: Adult observes the child's play and attempts to fit into and be responsive to the play to the degree that the child allows or seems interested.

Validity: A measure of whether test items measure the characteristic(s), aptitude, intelligence, etc. that they were designed to measure.

VOCA: Voice output communication aid. This term refers to any electronic AAC approach which produces voice output.

Voice input: A voice recognition system which enables the computer to receive, recognize, and convert human voice input into data or other instructions.

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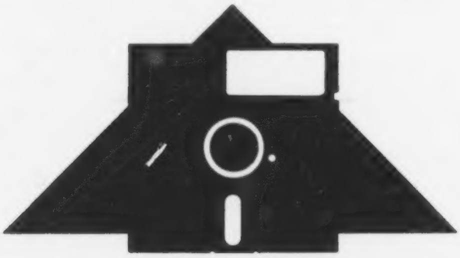
PROJECT PREPARE

Leaders Planning Guide
and
Evaluation Form

Technology



LEADER PLANNING GUIDE

In order to assure successful in-service presentations, a number of critical items must be addressed by the leader before, during, and after the training day.

Before the Training Day:

______ Arrange for setting (e.g., meeting room, chairs, lunch, and audio visual materials and equipment)

______ Prepare and disseminate flyer

______ Review module and prepare presentation
  a. Review Glossary
  b. Collect or prepare materials needed for selected activities (e.g., toys, videos)

______ Duplicate necessary overheads and handouts

______ Prepare and duplicate agenda

______ Duplicate Pre/Posttest
(May be sent before session and returned with registration in order to assist in planning)

______ Duplicate participant evaluation form

______ Prepare a sign-in form in order to gather name and position (discipline) of participants

During the Training Day:

______ Require each participant to sign in

______ Provide each participant with:

  ______ Agenda

  ______ CEU information (if applicable)

  ______ Pre/Posttest

  ______ Necessary handouts

  ______ Participant evaluation form (end of the day)

______ Explain CEU process (if applicable)

______ Explain participant evaluation process

______ Have participants complete Pretest (if not completed earlier)

______ Present module seminar

______ Collect CEU information and checks (if applicable)

______ Have participants complete Posttest and participant evaluation form

______ Collect completed Posttest and participant evaluation forms

After the Training:

______ Complete the leader evaluation form

______ Mail a copy of the following to:
Project Prepare
Cuyahoga Special Education Service Center
14605 Granger Road
Maple Heights, Ohio 44137

______ Leader evaluation form

______ Compilation of Participant evaluation forms

*Are you seeking Project Prepare Certification? ____ Yes ____ No

*All qualified staff development leaders are encouraged to use the materials for the preparation of personnel who are working with young children who have special needs. Staff development leaders who wish to become certified Project Prepare Leaders are required to conduct a staff development session utilizating each of the nine Project Prepare modules. Each session must be at least five hours in length. Data regarding module certification will be gathered through the leader evaluation forms by Project Prepare, Cuyahoga Special Education Service Center. The names of the Project Prepare Certified Leaders will be placed on file with the Ohio Department of Education, Division of Early Childhood Education and the 16 Special Education Regional Resource Centers.

PROJECT PREPARE
LEADER EVALUATION FORM

Leader Name ______________________ Date ______________________

Agency ______________________ SERRC Region ______________________

Address ______________________ Module Title ______________________

____

Number of in-service participants __________

Using the sign-in form, please indicate the number of participants from the following disciplines or positions that attended the session.

Early Childhood Special Educator	( )	Special Educator	( )
Early Childhood Educator	( )	Administrator	( )
Occupational Therapist	( )	Psychologist	( )
Physical Therapist	( )	Teaching Assistant	( )
Speech/Language Therapist	( )	Parent	( )

Other (specify) ____

Please answer the following questions.

1. To what extent did these materials allow you to meet your in-service objective?

   (   ) Not at all (   ) Somewhat (   ) For the most part (   ) Completely

2. How would you rate the interest level of the activities?

   (   ) Low (   ) Average (   ) High

3. Would you recommend these materials to other professionals involved in early childhood staff development?

   (   ) Yes (   ) No

4. Comments ____

____

____

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____

____

PARTICIPANT EVALUATION FORM

INTRODUCTION: Thank you for attending this in-service session. We would appreciate receiving your feedback on the success of the training on the questions listed below. The information that you provide will be used to help us plan future events.

DIRECTIONS: Please answer item 1 by placing a (√) beside your current position. For items 2 through 9 check the response that most closely matches your feelings about each statement. Supply the requested information for items 11 through 13.

1. Current Position:
( ) Early Childhood Special Education Teacher
( ) Early Childhood Teacher
( ) Special Education Teacher
( ) Regular Education Teacher
( ) Speech/Language Therapist
( ) Physical Therapist
( ) Occupational Therapist
( ) Administrator
( ) Teaching Assistant
( ) Parent
( ) Other (please specify) ________________

	Unacceptable	Poor	Average	Good	Excellent
2. Overall, I felt that the in-service session was	( )	( )	( )	( )	( )
3. I felt that the organization of the in-service activities was	( )	( )	( )	( )	( )
4. The presenter's approach to sharing information was	( )	( )	( )	( )	( )
5. My understanding of the information presented today is	( )	( )	( )	( )	( )
6. The way in which this session met my (professional/parenting) needs was	( )	( )	( )	( )	( )
7. The new ideas, skills, and/or techniques that I learned today are	( )	( )	( )	( )	( )

	Unacceptable	Poor	Average	Good	Excellent
8. My motivation level for using the information and/or techniques presented today is	( )	( )	( )	( )	( )
9. The way in which children and/or families that I work with will benefit from my attendance today is	( )	( )	( )	( )	( )

10. Would you recommend this workshop to others?

( ) Yes ( ) No

11. What were the most useful aspects of this in-service?

12. Which aspects of the training do you feel could be improved?

13. Do you have any specific needs related to this topic that were not met by this in-service?

( ) Yes ( ) No

If yes, what additional information would you like to receive?

Technology (General)

PRE/POST TRAINING ASSESSMENT

Rate the following competencies as to your current level of knowledge and expertise.

0 = Not necessary in my position
1 = Truly unfamiliar
2 = A little knowledge
3 = Somewhat familiar
4 = Very knowledgeable

0	1	2	3	4	
					1. Recognize important benefits for young children with special needs when assistive technology is used in the preschool setting.
					2. Aware of ways that switch use can give young children with disabilities a means of controlling events in their environments.
					3. Recognize that computers can be adapted in a variety of ways for use with young children with special needs.
					4. Recognize adapted computer applications as a tool for meeting individual instructional goals.
					5. Aware that children with severe communication difficulties can be assisted by the use of appropriate augmentative/alternative communication (AAC) systems.
					6. Aware of basic sources and strategies for obtaining funding for assistive technology.

Comments: ____

____

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____

Technology (Staff)

PRE/POST TRAINING ASSESSMENT

Rate the following competencies as to your current level of knowledge and expertise.

0 = Not necessary in my position
1 = Truly unfamiliar
2 = A little knowledge
3 = Somewhat familiar
4 = Very knowledgeable

0	1	2	3	4	
					1. Recognize ways that assistive technology can provide developmentally appropriate experiences for young children with special needs.
					2. Familiar with specific ways switches can be used to provide greater control and participation within curricular activities.
					3. Familiar with specific ways the computer can be adapted to meet the individual learning needs of young children with special needs.
					4. Familiar with specific strategies for using adapted computer applications to achieve ongoing curricular goals.
					5. Familiar with specific ways augmentative/alternative communication (AAC) systems can be used to promote communication and interaction for young children with severe communication difficulties.
					6. Able to communicate pertinent information with others regarding sources and practical strategies for obtaining funding.

Comments: ____________________

Technology (Administrator)

PRE/POST TRAINING ASSESSMENT

Rate the following competencies as to your current level of knowledge and expertise.

0 = Not necessary in my position
1 = Truly unfamiliar
2 = A little knowledge
3 = Somewhat familiar
4 = Very knowledgeable

0	1	2	3	4	
					1. Familiar with various methods of facilitating family involvement in the application of assistive technology.
					2. Recognize positive benefits for all young children with a switch application provides equal opportunities for curricular participation.
					3. Recognize positive benefits for all young children when adapted computer application is used to provide equal opportunities for curricular participation.
					4. Recognize positive benefits for all young children when adapted computer applications are fully integrated within the ongoing curriculum.
					5. Recognize developmental and programmatic advantages when augmentative/alternative communication (AAC) systems are utilized to ensure a means of communication and interaction for all children.
					6. Recognize implication of federal special education law in determining local district responsibility in provision of assistive technology aids and services.

Comments: ____

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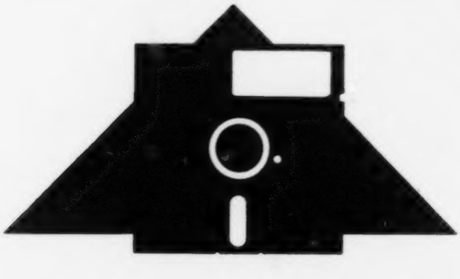
PROJECT PREPARE

Modules for Competency-Based
Personnel Preparation in
Early Childhood Education

Technology



General

GOALS

1. Gain an overview of assistive technology and its integral role within curricular strategies for young children with disabilities.

2. Become familiar with switch application as a means of allowing young children with disabilities greater opportunity for independent control and participation.

3. Gain introduction to basic use of computer and peripherals with young children who have disabilities.

4. Explore how application of computers and peripherals can be successfully integrated within a curriculum for young children with special needs.

5. Gain an overview of augmentative/alternative communication (AAC) system as a means of meeting the needs of young children with severe communication difficulties.

6. Gain practical information regarding obtaining funding for assistive technology devices and services.

GOAL 1

Technology

LEVEL: GENERAL

GOAL: **#1** Gain an overview of assistive technology and its integral role within curricular strategies for young children with disabilities.

COMPETENCY TYPE: KNOWLEDGE

OBJECTIVE: Participants will become familiar with several ways technology can impact the lives of young children with disabilities.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
1. Large group activity Distribute Handout, *Preschool Children,* and point out the broad range of technology which is available to support the acquisition of early learning milestones.	1. Handout (G-H0) Tech Use Guide: *Preschool Children* (from CEC) Use personal slides (if available).	1. Introduce the section by explaining that technology in today's world is used to enhance independence, and to increase social, play, and communication skills in young children. Leader should make mention of devices that they have used with young children. Make sure that the wide range of technology is emphasized — both "low tech" and "high tech." The leader may choose to mention items such as: – Muppet Learning Keys (early childhood keyboard for computer input) – Items children with visual impairment might utilize, such as Talking Books, Magnifiers, Beeper Ball (a ball with auditory signal; the child can hear it approaching), Braille printer (prints pictures with tactile feedback), Textured overlays for communication devices or Power Pad, etc. – Items children with hearing impairment might utilize, such as FM auditory systems, Echo Speech Synthesizer with headphones (adds auditory output for computer programs), use of an amplified classroom, etc.

LEVEL: GENERAL *(continued)*

GOAL: **#1** Gain an overview of assistive technology and its integral role within curricular strategies for young children with disabilities.

COMPETENCY TYPE: KNOWLEDGE *(continued)*

OBJECTIVE: Participants will become familiar with several ways technology can impact the lives of young children with disabilities.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
		Personal slides can be used to exemplify these devices. Based on availability, leader can show or demonstrate additional items. Families may have concerns about some aspects of technology in modern life in general and/or in the specific context of education. These may be associated with cultural values and practices (e.g., religious). Encourage discussion of such issues.

PRESCHOOL CHILDREN

Babies and young children quickly learn that their daily interactions with the environment produce effects. Play is the child's way of learning. Looking, interacting, manipulating, crawling, toddling, and exploring are actions which begin early learning experiences. The sooner diversified experiences are introduced, the faster the child will learn to influence and control his or her environment.

Many children with disabilities are unable to interact with their environment. Thus, their development may be hindered. When early motor or intellectual experiences are restricted, delayed, or distorted, other lines of development are adversely affected as well. Lack of early experiences will affect later learning and socialization.

Young children with disabilities need early successful experiences in controlling their environment as do their peers without disabilities. Technology is one alternative which may provide successful opportunities when the child is unable to receive quality experiences through natural means. Many toys can be easily adapted so they can be controlled by a child who is severely physically disabled. Similar adaptations to a computer can provide access to a wide variety of computer-controlled environmental experiences for the very young child with disabilities.

Not only will technology benefit young children who are severely disabled, but will also augment the experiences and learning opportunities of children with mild disabilities. Computers can be used as a tool for learning other skills such as readiness concepts, visual motor coordination, and social skills. Children who use the computer at an early age will have the advantage of growing up with the technology and using it to their benefit throughout life. They stand to gain more and lose less through increased learning opportunities presented by the technology.

The Technology

A computer system for a young child should allow the use of alternative input devices and provide good color graphic output. Most young children are not ready for the standard computer keyboard thus alternatives should be available that easily connect to the basic computer system. These may include alternative keyboards, touch pads, pointing devices, and switches. Most programs for young children utilize color graphics, sound, and motion rather than written text so alternative output devices may be required. These may include a color monitor, voice synthesizer, or an environmental control unit.

Play

Within the natural play environment, many developmental opportunities are presented in unstructured ways. Toys and other objects are found to entertain, allow curiosity to develop, and provide opportunities for motor coordination and language development. For children with physical limitations who cannot independently participate in these unstructured play environments, the technology can help structure similar play opportunities that promote positive interactions. A simple example is using a battery operated toy equipped with a switch (such as a train or animal) to give control of play activity to the child. By activating the switch (e.g. pressing, touching, or rolling on top of it) the child can manipulate the toy. Infants as young as three months have "played" in computer-controlled environments to discover relationships between their actions and objects in their environment. These planned environments can also encourage motor development by positioning toys to encourage arm placement, pointing, and posture control.

As children grow older they love to play games. Preschoolers are just beginning to learn cooperative play. Computers offer unique opportunities to play games because they can direct turn taking and neutralize some of the motor skills needed to play. Consequently they can provide a recreational outlet for many nonverbal children and children with severe physical disabilities as well as their peers without disabilities. For example, a computer can simulate a board game. Using a switch or other alternative input device, the child activates the computer-generated spinner and moves to the next spun color or number space. Other examples include moving target games, matching exercises, and story boards.

Learning

During the early development years there is little differentiation between communication, language, and cognition. Early communication begins with intentional actions that gain someone's attention. The child with very severe disabilities may have no means to achieve this goal. Toys and buzzers activated by simple switches could be used for this early rudimentary communication task. A computer system can also be designed to assist with communication on this very early developmental level and can also be designed to assist on highly sophisticated levels, depending on the user's needs. This versatility makes the computer a viable option for communication devices — it can change with the changing communication needs of the user. For more infrmation about this topic request the Tech Use Guide on Augmentative Communication from the Center.

There are several ways the computer can be used to assist in the development of language skills. The computer can function as a beginning communication device and language acquisition aid. Some of the alternative keyboards have authoring programs that allow the board to be used as an alternative communication device or as a talking board that teaches and reinforces language concepts. Vocabulary with these programs can be changed in a matter of minutes.

Other programs are designed to teach higher level expressive and receptive language skills. Talking word processors which pronounce letters, numbers, words, phrases, and full text can be used to introduce language to students. In this application the computer becomes a tool for teaching reading and writing as well as language and communication.

In addition to language skills, computers can be used to teach independence. With a switch operated toy, a child can learn cause/effect relationships and choice selection and improve memory skills. These are just some of the basic skills needed to learn other skills later.

Motor and perceptual skill development are two other areas of learning in which the computer can assist the young child with disabilities. Visual-perceptual skills can be taught and reinforced through the use of simple game-like programs that use moving visual targets and timed motor responses to gain reinforcement. Another motor training application is the use of switches to promote postural changes or specific muscle movements. An example is placing a mercury switch on a child's head — when the child brings his or her head to an upright position, the tape player turns on reinforcing music.

Assessment

The computer can provide an opportunity to assess children at an earlier age. Alternative input devices allow the child to demonstrate cognitive abilities unhampered by delayed motor abilities. For example, with a touch sensitive screen, the child merely touches the computer screen to indicate a selection. Or a child can touch a picture which is placed on an alternative keyboard (e.g. Power Pad or Unicorn Board). By using these and other devices, the teacher can be more assured of assessing the target cognitive skill rather than the child's motor disability.

Access

For many preschoolers, including those with disabilities, the standard keyboard is not the best input method. Tiny hands often have a hard time pressing the small keys. Also, many preschoolers are nonreaders and have not mastered the alphabet, let alone the keyboard. Well designed software programs for young children overcome these barriers. Often preschool software programs only use a handful of keys. By highlighting the keys or blocking all others out, the child can become very successful with the task at hand. Stickers placed on important function keys (e.g. spacebar or return), keyguards, or a homemade mask which denotes only specific key area, are some helpful and easy solutions.

For children who need more than a minor modification, other alternatives include joysticks, game paddles, light pens, touch windows, a mouse, or expanded keyboard. These commonly available devices require specially written, but fairly common, software. Other specialty input devices such as switches, eyetrackers, and headpointers require special purchase and special programs. Many alternative keyboards require special software. Sometimes an adaptive firmware card will need to be installed in the computer before an alternative keyboard, switch, or scanning device can be used.

Selecting the appropriate device will depend on the specific needs of the child. For more information about this topic, request the Tech Use Guide on Computer Access from the Center.

Software

Before selecting any software program, determine the prerequisite skills needed to operate the program and the functioning level of the preschooler. These criteria are very important and should influence your decision. When teachers and parents first introduce a computer to a child, the goals should be to allow the child to use it as independently as possible, have a positive experience, feel in control, and be successful. Important features that software for preschoolers should possess include:

- **Clear, concise documentation.** The documentation or teacher's guide should be easy to read and informative.
- **Sound educational value.** Software should support the curriculum, reinforce correct answers, provide cues for incorrect answers, not provide rewards for incorrect answers (they should be ignored), and present a reading level that matches the child's ability.
- **Color, graphics, and sound.** Software should be colorful, interesting, animated, and enhanced with sound. Screens should be uncluttered, shapes easily recognizable, and if print appears on the screen it should be large enough for a preschooler to read. If a child is prone to seizures, avoid programs with flashing lights or graphics which may activate a seizure.
- **Adaptability.** The program should be modifiable. You should be able to change the level of difficulty, content, speed of presentation to fit the child.
- **Limited key input or alternative device usage.** Many preschoolers cannot use standard keyboard. As already mentioned the keys are too small, too close together, require too much pressure to activate, are too far from the child's reach, or are not in sequential order. Limiting key input to one or two keys is one solution, alternative devices are another.
- **Data collection.** If you are using the software for training or instruction, a management program is desirable. Information such as the number of correct responses, number of trials, or actual raw data will help you plan the child's program more effectively.

While you may think of other features that are important for the individual needs of your students, this guide will help you get started. Develop a list of features that are most important for your students. Narrow you selection to two or three programs. Review all programs before any are purchased.

GLOSSARY

Adaptive Firmware Card (AFC) — The AFC is a small circuit board that is placed inside the computer. A small external connector box, which comes with the AFC, is mounted on the side of the computer. Switching devices plug into this connector box. The AFC allows the computer to be accessed by any one of 16 input methods, depending on the physical ability of the user and the type of switch needed. Various input methods include: expanded keyboards, switches, morse code, and augmentative communication devices. The AFC also has several other features which are appropriate for use with young children. For example, one feature allows one to slow down the speed of the computer and thus slow down the action of an arcade-type computer game.

Alternative input device — Traditional or standard input to a computer is the keyboard. However, for many children with disabilities, standard input devices are a barrier to computer use. Non-traditional or alternative input devices have been designed to give the child a means to access the computer. These include expanded keyboards, switches, joysticks, touch windows or voice input.

Alternative keyboards — Touch sensitive boards which attach easily to the computer and bypass the standard keyboard as the input device are known as alternative keyboards. Some keyboards, through special programming, can change the definition and size of the keys to be altered by allowing several adjacent keys to act as one large key. Keyboards vary on the degree of pressure needed to activate the software.

Detachable keyboard — A keyboard that is not attached to the central processing unit (CPU) of the computer. A detachable keyboard usually attaches to the computer via a coiled cable much like that of a telephone cord. This keyboard can be placed just about any place the cord will reach (e.g., in a child's lap or on the floor).

Expanded keyboard — A large, oversized keyboard that replaces the traditional keyboard. Examples include the Muppet Learning Keys, the Power Pad, and the Unicorn Board.

Keyguard — A plastic or metal sheet with finger-size holes in it that correspond to the key locations of the keyboard. The keyguard is placed over the computer keyboard to help people with poor motor control select the right keys. Some have latching keys that allow the user to hold down two keys at once with only one finger or a headstick.

Mask — A device that is placed over a keyguard to block out extraneous keys and to place focus on a specific key area (e.g., return key). These are usually made out of cardboard and are noncommercial.

Membrane keyboard — A keyboard which is similar in function to a standard keyboard, but is generally more rugged and larger. The membrane protects the keyboard circuitry from moisture or spills. Some membrane keyboards are also programmable for added flexibility. Examples include the Muppet Learning Keys and the Power Pad.

Speech input — The ability of a microcomputer to recognize speech as a form of data input.

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Speech output — A method of output that enables a computer to reproduce speech via a speech synthesizer.

Speech recognition — The technology of making a computer understand human speech, which makes it possible to transmit data or instructions to a computer with voice commands.

Speech synthesizer — A method of output that enables a computer to reproduce speech.

Switch — A device that allows alternative access to a computer or battery operated toys. The most common switches are push, lever, leaf, wrinkle, and sip and puff. Pressure against a switch turns it on while release of this pressure turns the switch off.

Touch sensitive — A touch sensitive device is a method of input which is activated by a light pressure of the hand or stylus.

READINGS

Burkhart, L. J. (1982). *More homemade battery devices for severely handicapped children with suggested activities.* College Park, MD: Author. Available from L. J. Burkhart, 8503 Rhode Island Avenue, College Park, MD 20740.

Burkhart, L. J. (1987). *Using computers and speech synthesis to facilitate communicative interaction with young and/or severely handicapped children.* College Park, MD: Author. Available from L. J. Burkhart, 8503 Rhode Island Avenue, College Park, MD 20740.

Morris, K. J. (1989). Alternative computer access methods for young handicapped children. *Closing the Gap,* 7(6), 1-15.

Pressman, H. (1987). *Making an exceptional difference: Enhancing the impact of microcomputer technology on children with disabilities.* Boston, MA: Exceptional Parent.

Rauschert, M. & Schneider, C. (1988). The use of robots in the preschool handicapped classroom. *Closing the Gap,* 7(4), 24-25.

Robinson, L. & Rauschert, M. (1988). Computer technology as a tool for preschool handicapped children. *Closing the Gap,* 7(4), 26-29.

Wright, C. & Nomura M. (1985). *From toys to computers: Access for the physically disabled child.* San Jose, CA: Author.

PERIODICALS

Closing the Gap, P.O. Box 68, Henderson, MN 56044.

Exceptional Parent, 1170 Commonwealth Avenue, Third Floor, Boston, MA 02134.

Journal of Early Intervention, The Division for Early Childhood, The Council for Exceptional Children, 1920 Association Drive, Reston, VA 22091.

Teaching Exceptional Children, The Council for Exceptional Children, 1920 Association Drive, Reston, VA 22091.

Topics in Early Childhood Special Education, PRO-ED, 5341 Industrial Oaks Boulevard, Austin, TX 78735-8809.

SOFTWARE RESOURCE LIST

Alphabet Circus, DLM Teaching Resources, One DLM Park, Allen, TX 75002, 800-527-4747.

Early Games for Young Children, Springboard Software, Inc., 7807 Creekridge Circle, Minneapolis, MN 55435, 612-944-3912.

Keytalk, Peal Software, Inc., 2210 Wilshire Boulevard, Suite 806, Santa Monica, CA 90403, 213-451-0997.

Language Development Series, Scott, Foresman & Company, 1900 East Lake Avenue, Glenview, IL 60025, 312-273-5900.

Reading Readiness: Visual Discrimination, EMC Publishing, 300 York Avenue, St. Paul, MN 55101, 800-328-1452.

ALTERNATIVE INPUT SOFTWARE RESOURCE LIST

Alphabet with Tom and Andy, Dunamis, Inc., 3620 Highway 317, Suwanee, GA 30174, 800-828-2443.

Exploratory Play, Peal Software, Inc., 2210 Wilshire Boulevard, Suite 806, Santa Monica, CA 90403, 213-451-0997.

First Words, Laureate Learning Systems, Inc., 110 East Spring Street, Winooski, VT 05404, 802-655-4755.

Gertrude's Secrets, The Learning Company, 6493 Kaiser Drive, Fremont, CA 94555.

Keys to Success: Computer Keyboard Skills for Blind Children, Life Science Associates, 1 Fenimore Road, Bayport, NY 11705, 516-472-2111.

The New Talking Stickybear Alphabet, Optimum Resource, Inc., 10 Station Place, Norfolk, CT 06058, 800-327-1473.

SPEECH SYNTHESIZERS

Cybertalker, Cyberon Corporation, 1175 Wendy Road, Ann Arbor, MI 48103, 313-665-8512.

The Echo Family of Speech Synthesizers, Street Electronics Corporation, 1140 Mark Avenue, Carpinteria, CA 93013, 805-684-4593.

Personal Speech System, Votrax, Inc., 1394 Rankin Road, Troy, MI 48083-4074, 800-521-1350.

INPUT DEVICES

Muppet Learning Keys, Sunburst Communications, 39 Washington Avenue, Room EP, Pleasantville, NY 10570, 800-431-1934.

TouchWindow, Edmark Corporation, 14350 North East 21st Street, Bellevue, WA 98009-3903, 800-426-0856.

Unicorn Expanded Keyboard, Unicorn Engineering Company, 6201 Harwood Avenue, Oakland, CA 94618, 415-428-1626.

SWITCH MANUFACTURERS

CompuAbility Corporation, 40000 Grand River, Suite 109, Novi, MI 48375.

Don Johnston Developmental Equipment, P.O. Box 639, 1000 N. Rand Road, Bldg. 115, Wauconda, IL 60084-0639, 800-999-4660.

Prentke Romich Company, 1022 Heyl Road, Wooster, OH 44691, 216-262-1984.

Steven E. Kanor, Ph.D. Inc., 8 Main Street, Hastings-on-Hudson, NY 10706, 914-478-0960.

TASH (Technical Aids & Systems for the Handicapped, Inc.), 70 Gibson Drive, Unit 12, Markham, Ontario, Canada L3R 4C2, 416-475-2212.

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Additional **Tech Use Guides** on the following topics are available from the Center upon request:

- Guide for Teachers
- Guide for Parents
- Technology for Work, Home, and Leisure
- Computor Access
- Selecting Software
- Selecting Hardware
- Learning Disabilities
- Hearing Impairments
- Physical Disabilities
- Visual Impairments
- Telecommunication Networks
- Augmentation Communication

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LEVEL: GENERAL

GOAL: **#1** Gain an overview of assistive technology and its integral role within curricular strategies for young children with disabilities.

COMPETENCY TYPE: SKILL

OBJECTIVE: Given a case study, participants will identify ways that technology could impact the life of a young child with a disability.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
1. Small group activity Present the case study on Transparency G-T1. Ask the participants to plan appropriate applications of technology for this child. You may choose to use the following case study or adapt one based on the particular population served by the group. **Case Study:** Johnny is a four-year-old child with cerebral palsy and a mild developmental delay. He has weakness in his motor control and finger dexterity. He is not able to hold his crayons, and has a difficult time manipulating the toys in the classroom. Leader should attempt to elicit ideas from the group on possible use of technology. Suggested applications for discussion: - Adapted toys with switches - Use of coloring software on the computer (e.g. Electric Crayon) with some type of adapted access, if necessary. These might include use of a keyguard, switch, Power Pad, or Touch Window. - Use of software and speech synthesizer on the computer for language development. Examples might be Keytalk, Exploratory Play, or Sticky Bear Opposites.	1. Transparency (G-T1) *Case Study*	1. In exploring ideas elicited by group, integrate these important ideas within the discussion: - Emphasize the importance of a *transdisciplinary team approach* in planning technological applications. Discuss the unique perspective that each team member brings to the process (e.g., parent, teacher, speech/language therapist, OT, PT, other related service personnel). Highlight the critical role played by *family involvement.* - Emphasize the importance of using an approach which *integrates the technological application within the normal curricular activities.* - Have participants plan specific applications of technology which would *encourage development of play, socialization, communication, and independence.*

LEVEL: GENERAL *(continued)*

GOAL: **#1** Gain an overview of assistive technology and its integral role within curricular strategies for young children with disabilities.

COMPETENCY TYPE: SKILL *(continued)*

OBJECTIVE: Given a case study, participants will identify ways that technology could impact the life of a young child with a disability.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
– If Johnny is in a wheelchair, modifications may need to be considered to ensure access to his physical environment. To illustrate the team approach and the importance of family involvement within this case study, the following points might be made: – Johnny's speech/language therapist can contribute valuable suggestions for his vocabulary development with software application. – The O.T. and P.T. can ensure that he is seated properly at the computer to maximize the most efficient access. – The parent can provide Johnny's favorite toy to encourage high levels of motivation for learning to use a switch. To emphasize the need for integrating Johnny's technology within the class' normal curricular activities, points such as the following might be made: – Johnny is able to complete his art projects with the other students by using the drawing or coloring software. At other times, he is able to complete the regular class activities by using a special hand splint. – Johnny is able to participate in the group play time by using an adapted toy.		

LEVEL: GENERAL *(continued)*

GOAL: **#1** Gain an overview of assistive technology and its integral role within curricular strategies for young children with disabilities.

COMPETENCY TYPE: SKILL *(continued)*

OBJECTIVE: Given a case study, participants will identify ways that technology could impact the life of a young child with a disability.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
2. Large group activity Leader may present Transparency G-T2, *General Principles for Applying Early Childhood Technology* and ask participants if their ideas have been in keeping with these general principles. Participants may discuss possible modifications to their original ideas.	2. Transparency (G-T2) *General Principles for Applying Early Childhood Technology*	

CASE STUDY

Johnny is a four-year-old child with cerebral palsy and a mild developmental delay. He has weakness in his motor control and finger dexterity. He is not able to hold his crayons, and has a difficult time manipulating the toys in his classroom.

GENERAL PRINCIPLES FOR APPLYING EARLY CHILDHOOD TECHNOLOGY

- Transdisciplinary team approach
- Active family involvement
- Integration of technology into regular curricular activities
- Applications encourage development of play, socialization, communication, and independent functioning.

LEVEL: GENERAL

GOAL: **#1** Gain an overview of assistive technology and its integral role within curricular strategies for young children with disabilities.

COMPETENCY TYPE: VALUE/ATTITUDE

OBJECTIVE: Participants will develop an appreciation for the ability of applied technology to enable children to perform developmentally appropriate activities.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
1. Large group activity Ask participants for examples of the impact of technology on their own lives. i.e. contrast: typing - word processing carbon paper - Xerox cooking on stove - microwave writing - phoning or faxing		1. Within this discussion, be sure to highlight the Four General Principles: – Transdisciplinary Approach – Family Involvement – Integration of technology within regular curricular activities – Applications encourage development of play, socialization, communication, and independent functioning.
2. Large group activity Ask for examples of how young children can experience similarly drastic improvements in their ability to do their "work" with the use of technology. When children are able to play with technological adaptations (switches, adapted toys, computer programs), they can achieve developmental progress in the areas of communication, cognitive, perceptual motor skills, problem-solving skills, and socialization. Play is the motivator for young children; technology allows them to participate in developmentally appropriate activities.	2. Handout (G-H1) *Families and Technology*	2. Emphasize that use of technology is not the goal itself, but that its use enables the child to independently perform activities determined to be developmentally appropriate.

FAMILIES AND TECHNOLOGY

Not only are parents* and extended family members the first and primary teachers of their children, they are children's life-long advocates. So if young children are to receive the benefits of technology experiences, families must be included in the entire effort, from the initial decision to explore the possibility of technology use for their children through the day-to-day experiences with equipment and decisions about software. Family members' suggestions enhance the likelihood that computer activities will be appropriate for a particular child. When a mother tells you, "He really likes music, but fuzzy textures seem to frighten him," she provides the information you need to determine appropriate initial software and choices for switches.

ACTT's family participation component reflects the emphasis on family involvement required in federal legislation. Public Law 99-457 states that "whenever appropriate and to the extent desired by parents, the preschooler's Individualized Education Plan (I.E.P.) will include instruction for parents." Technology workshops and parent meetings which meet parents' needs for computer information and skills are a part of ACTT programs. Part H of P.L. 99-457, which impacts handicapped infants and toddlers, directs that Individual Family Service Plans (IFSP) be developed. Including technology information and skills in the IFSP is both an important element for families of young children and easily "do-able" if staff members are ready to teach family members, using appropriate "adult learner" strategies.

Differences in Family Participation

Families require different levels of input into their children's programs, depending on daily living pressures, available time, perceptions of their role as parents, and a myriad of other factors (e.g., more mothers are now working because of economic necessity). On one hand, some parents may want the professional to make all the decisions and carry out activities since that is, according to the parents' perception, supposed to be the professional's role. These parents may want information but not participation. On the other hand, some parents wade right in, take major responsibility for all intervention activities, and make informed decisions about future directions for their children. Families' participation ranges on a continuum between the two.

Although it is beyond the scope of the **Building ACTTive Futures,** current literature on early intervention clearly defines family systems and the approaches families from various cultures deem acceptable. A clear understanding of family systems is necessary when decisions about technology applications are being made in an early intervention program.

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*The terms "parents," "family members," and "primary caregivers" are used interchangeably in this section.

When children are very young and/or severely disabled, the input and interest of families is more critical to the success of computer applications than it may be for the more mildly involved children in a preschool classroom. If parents or primary caregivers are not committed to the importance of technology applications for their children with severe disabilities, results are diluted. If a young child must use a communication program to indicate what s/he wants to eat, drink, or play with, using the same or a similar system at home as at school provides continuity, repeated practice, and a better chance of success. In this case, parents need to be directly involved with their child's program and knowledgeable about the equipment and software. On the other hand, direct participation of parents is not critical to the success of a mildly involved child who spends a morning in a preschool program learning about directionality by moving a Logo turtle through a maze.

Since technology is an exciting part of our world, family interest is usually high. Acquiring technology skills may very well provide a marketable new skill for mothers, fathers, grandparents, and other family members. Often the addition of technology to early intervention efforts results in a higher level of father interest and participation. Mothers, as well, are intrigued by the possibilities computers offer for themselves and for their children. Learning more about the potential and the effects of technology on children's developing skills and abilities is a high priority for most parents.

Levels of Family Participation in ACTT

Being "involved" does not necessarily mean that family members have to be present in the classroom. Parents can be involved in their child's program in many ways. Some parents choose passive involvement, demonstrating an awareness and support of their child's activities. Other parents may actively participate in computer activities, learning all they can about computer use for their child and themselves. And other parents may become active leaders, choosing to assist with activities in the classroom.

Because we recognize the differences in family participation, ACTT plans for three different levels of parent involvement:

1. awareness of aspects of technology intervention,
2. assisting with technology intervention, and
3. conducting technology interventions.

In one sense, the levels are sequential, from beginning to learn about technology applications to a growing sophistication in computer adaptations. However, the choice of level of participation will vary depending on family commitments. At all times family members decide upon their own level of participation. We believe that providing inviting opportunities for acquiring further computer skills promotes the potential for increasing involvement. We include activities for each level of involvement together with sections dealing with aspects of birth through three and severely disabled programs as well as preschool classrooms.

Source: Building ACTTive Futures, ACTT's Curriculum Guide for Young Children and Technology, Macomb Projects, College of Education, Western Illinois University, Macomb, IL 61455.

THREE TO FIVE

Parent Participation in Technology Activities

No matter the age or disabling condition of their children, levels of family involvement are similar. Those who work with the preschool population should refer to the previous sections for general philosophy and practices for working with parents.

Parents are more willing to participate in computer activities if they feel comfortable and competent at the computer. Competencies parents need to assist and conduct computer activities are listed in Figure 1. For a more detailed set of competencies for parent and staff training, refer to the "Competencies" chapter in this curriculum guide.

The adults should also know how to handle equipment properly. Knowing the correct names of the computer components (monitor, disk drive, keyboard, etc.) is useful. Computer terminology somewhat overwhelms people at first, but once they learn a few words and can speak the 'lingo,' it's not so frightening. Thorough knowledge of what to expect from a piece of software is important if an adult is going to conduct a computer session.

Information Level

Providing information about classroom computer availability and the intended use of computer activities in the curriculum are the first steps in involving families in educational computing. Two options for providing families with this information are a newsletter and a parent meeting.

A weekly or monthly newsletter sent to all families involved in the program is an excellent way to introduce the computer and computer activities. Read the section on Severe Disabilities for ideas on what such newsletters could contain. Throughout the school year, newsletters can inform parents about the new software being used, ways the computer helps children meet IEP goals, and future plans for classroom computer use.

A workshop or informal meeting effectively introduces families to the computer's role in their children's education. These meetings provide opportunities to demonstrate the types and attributes of software and peripherals and the ways children will be using the computer at school. Parents are encouraged to become acquainted with the computer, software, and peripherals through "hands-on" activities. Some parents may express particular interest in the computer and will want to learn more about their child's computer activities. Computers are good incentives for getting fathers involved.

In planning an awareness workshop, keep the atmosphere as informal and non-threatening as possible. The goal is to establish awareness of children's classroom activities and to provide opportunities for hands-on experience that may spark some interest and curiosity or alleviate fears about handling the computer. A relaxed friendly atmosphere will make parents comfortable in what may be a new experience and environment.

Assistance with Intervention

Once families know about their children's activities with the computer, they may want to see them using the computer. Parents who are able to come to the classroom may schedule a visit at a time when they can observe their child working individually and as part of a group. Such visits provide opportunities for the teacher to model computer teaching strategies for the parents and for the parents to provide feedback about their child's use of the program.

An after school or evening workshop enables family members who cannot visit the classroom during the day to observe their children at the computer. In addition, this workshop provides siblings the opportunities to observe and interact with each other in unique ways. A foundation for sibling sense of pride is created as the sibling with disabilities demonstrates skills at the computer.

If possible, have several computers available for the workshop and set up individual stations. Ideally, each family attending would have a computer, but if that is not possible, schedule specific times for each family to attend. During the workshop, the child can demonstrate computer skills to his/her parents. Family members soon begin to feel more familiar, and hopefully more comfortable, in interacting with their child at the computer. By modeling questions that encourage thinking skills (What would happen if ...), teachers encourage parents to ask such questions.

This level of involvement is often transitional. Some families will return to observe and ultimately participate in classroom computer sessions. If a parent is willing to assist in computer sessions, plan initial activities that parents can take part in comfortably. Because not all families are at the same level at a given time, schedule after school workshops on an on-going basis. Parents who are knowledgeable and willing may assist in organizing and presenting the workshops.

Conducting Computer Intervention

Results are almost always beneficial when parents work directly with their children. Parents provide ideas for making the intervention more enjoyable, challenging, and personal for their particular child. Parents who reach this stage of involvement see the computer as a valuable tool for helping their children gain new skills and reach IEP goals. With computer use, many goals are achieved that have seemed unattainable. Family members who share learning experiences with their children are rewarded by being part of this achievement.

Once adults are comfortable in assisting with computer activities, they may be ready to conduct a session with their child. As parents move to this level of involvement, they need opportunities to familiarize themselves with the computer and available software programs so they feel comfortable. Beginning activities should be kept simple to assure a successful experience. A teacher may help by

1. providing a clearly written explanation of the activity for review prior to the session,
2. posting directions near the computer to provide a convenient reference allowing for fewer questions and more independence, and
3. assembling all materials at the workstation prior to the intervention.

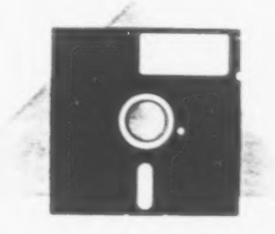
Some parents may be interested in developing their own computer activities for their child. The parent and the teacher should first discuss plans for implementation and their relevance to IEP goals. Once the parent has introduced and conducted the activity, s/he and the teacher need to discuss the effect of the activity, its success and/or failure. Parents are to be praised and thanked for their efforts, no matter what the degree of success.

At level three, it is assumed that parents possess a basic level of computer knowledge. Parent Competencies, listed in Figure 1, target those skills needed by parents to successfully plan and conduct computer intervention for their children. The following section will help teachers organize and conduct computer workshops to provide parents with the knowledge, skills, and confidence needed for them to become involved in the intervention program.

Source: Building ACTTive Futures, ACTT's Curriculum Guide for Young Children and Technology, Macomb Projects, College of Education, Western Illinois University, Macomb, IL 61455.

GOAL 2

Technology



LEVEL: GENERAL

GOAL: #2 Become familiar with switch application as a means of allowing young children with disabilities greater opportunity for independent control and participation.

COMPETENCY TYPE: KNOWLEDGE

OBJECTIVE: Participants will learn about types of switches and interfaces and why they are used.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
1. Large group activity The Switch a. Define switch b. Select one adapted battery operated toy and demonstrate switches with the toy. Identify and discuss each switch as it is introduced. c. Explain to participants that toys can be permanently adapted for switch use by vendors or by individuals, or can be temporarily adapted. Introduce another toy that has been permanently adapted and one that has been temporarily adapted. d. Discuss primary purposes and uses of switch application.	1. Handout (G-H2) *Commonly Used Switches* Handouts (G-H3A and 3B) *Switches* *Switch Use* Various switches: Plate, Flat, Mercury, Leaf, or others (available from SERRC or ORCLISH) Switch Toys (available from SERRCs or ORCLISH) Battery Adaptor for temporarily adapted toy. **Supplemental Resources** PITTS Module, *Switch Use* (provided at conclusion of this module), contains additional information.	1. Recommend that participants use Handout G-H2, *Commonly Used Switches* to follow along as each switch is introduced. Leader can refer to enclosed *Switch Use* (from PITTS) and Handout G-H3, *Switches* for additional information on switch access. Explain that a switch is a device used to control an object (i.e., toy, appliance, computer) with a single movement. Children with physical or cognitive limitations are enabled to independently control objects in their environments and thus participate to greater degrees. Explain that switch activation needs to be a reliable, consistent muscle movement, such as press of a hand, turn of a head, or even a blink of the eye. Point out that information from a PT, OT, and parent can be very useful in assessing which muscle movement should be utilized.
2. Large group activity The Switch Interface. a. Define switch interface. Depending on resources available: b. Demonstrate switch interface with timer and toy.	2. Handout (G-H4) *Switch Interfaces* Handout (G-H5) *Switch Ideas*	2. Recommend that participants use Handout G-H4, *Commonly Used Switch Interfaces* to follow along as each switch interface is introduced.

LEVEL: GENERAL *(continued)*

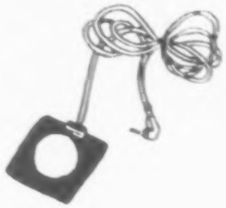
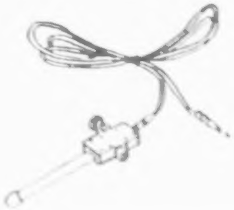
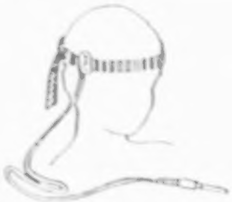
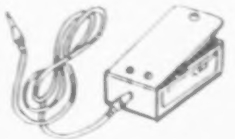
GOAL: #2 Become familiar with switch application as a means of allowing young children with disabilities greater opportunity for independent control and participation.

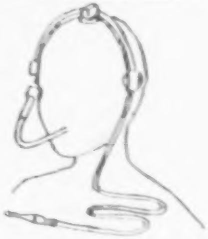
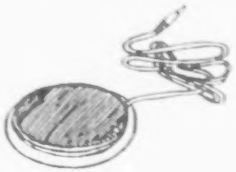
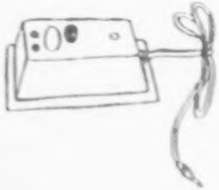
COMPETENCY TYPE: KNOWLEDGE *(continued)*

OBJECTIVE: Participants will learn about types of switches and interfaces and why they are used.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
c. Demonstrate switch interface with control unit and appliance. d. Demonstrate that switches can also be used to access an electronic communication board or computer.	Various switch interfaces, timer, control unit (available from SERRC or ORCLISH) Switch toys, common household appliances (tape recorder, fan, blender)	Explain that a switch interface is a connection between a toy, appliance, or computer and a switch. Interfaces can allow different options for a child. For example, switches interfaced with a timer allow toys or objects to stay on for a predetermined length of time. This may be important for children who do not have the necessary motor control or strength to sustain pressure on the switch.
3. Using examples from Handout G-H4, *Switch Ideas*, discuss how switch use not only allows a child to accomplish a given task, but also provides larger educational benefits, such as: a. Cause and effect as a foundation for learning. b. Environmental control can lead to further exploration. c. The use of switch activities as a motivator for learning and play, and the utilization of switch-activated play as a vehicle for further learning. d. Important developmental goals may be targeted through switch activities, such as: visual attention, imitation, following of directions, visual tracking, initiating and terminating interactions, and turn-taking.		Explain to participants that there are numerous single switch computer programs available for young children.

OVERVIEW OF COMMONLY USED SWITCHES

NAME	EXAMPLE	ACTIVATION	COMMENTS	VENDORS
Flat Switch		Small low force movement of arms, hands, legs, head, etc.	• flat size allows placement under many objects	Don Johnston TASH
Leaf Switch		Flexible switch that is activated when bent or pressed gently	• requires mounting • can improve head control, and fine motor skills	Don Johnston Kanor TASH
Mercury (Tilt) Switch		Gravity sensitive switch activates when tilted beyond a certain point	• can improve head or other posture control • attaches easily with velcro strap	HCTS Kanor TASH
Plate Switch		Downward pressure on plate by hand, foot, arm, leg, or other reliable movement	• most common • can be covered with different textures • some offer music, light, or vibration	Don Johnston Kanor TASH

NAME	EXAMPLE	ACTIVATION	COMMENTS	VENDORS
Sip 'n Puff		Sipping or puffing on tubing	• requires good head and mouth closure • can improve breath control • amount of air pressure adjustable	Kanor TASH
Switch 100 "Big Red"		Light touch anywhere on its top surface	• recommended for young children • click provides auditory feedback • diameter 5"	Ablenet
Voice Activated		Significant vocalizations (1 to 2 seconds)	• can improve vocalizations • has sound sensitivity control	Kanor

Source: Preschool Integration Through Technology Systems, (PITTS), United Cerebral Palsy Association of Western New York, Inc., 4635 Union Road, Buffalo, NY 14225; US DOE Grant #H024E80010.

SWITCHES

Why a Switch?

A switch is a simple device used to control input into a computer when a keyboard cannot be accessed. Switches are also used as alternative input mechanisms with modified battery-operated toys. Switches enable people with physical or cognitive limitations who cannot use a computer or device, such as a battery-operated toy, the ability to respond to environmental stimuli. Using a battery-operated toy activated by a switch allows even severely disabled children opportunities to control external events. Because they help children understand cause and effect, predictability, and normality, switches provide excellent preparation for future applications of environmental control and communication.

Switch Application and Learning Theory

Children who are otherwise unable to explore their environment can do so with the aid of a switch. Coupled with a computer software program, a switch is a mechanism for response enhancement. Cause and effect relationships can be developed using a software program such as **Switch 'N See** developed by Project ACTT. The child activates a switch, in lieu of a keyboard, to control the program. Battery-operated toys activated by a switch also allow a child the opportunity to control the environment. Once a child begins to realize that he can effect a change in his surroundings, his desire to explore the environment will be further stimulated. On a continuum, cause and effect development often sets the precedence for discriminatory learning. Likewise, when a developmentally disabled child understands the connection between the activation of a switch and a toy's movement, a foundation for independent learning is laid. A child's simple awareness of cause and effect provides a basis for all future learning.

Switches provide predictability and normality for children who cannot access certain devices due to physical or cognitive limitations. Predictability and stability of a child's environment fosters a child's self-satisfaction and autonomy, which is important in all areas of early developmental learning. Using switches with devices such as battery-operated toys gives a child the opportunity to experience normal play. Play encourages the development of social interaction.

Switch Selection

Because the needs and abilities of handicapped children are so diverse, matching the type of switch to the child is crucial for the child to successfully use it. Proper placement of the switch and positioning of the child are two important factors for optimal child response. The child's most reliable, comfortable, and stable body position must be assessed. The child's energies should be focused on operating the switch and responding to the stimuli, not on maintaining the "proper" body position.

After the most reliable body position is determined, the various types of switches can be evaluated. The tread, ribbon, pillow, and mercury switches are the most common switches with prices ranging from $5 to $200. The various types of switches discussed below can be customized to meet the needs of a particular child.

The Tread Switch: A tread switch is pressure operated. Pressure can be applied with the press of a finger, hand, head, or foot. When enough pressure or force is applied to the top of the switch, a connection will be made. As long as the pressure is applied, the circuit will remain completed and the connected device will continue to operate. When the pressure stops, the circuit will be broken and the connected device will be turned off. A tread switch can be made of durable materials such as wood and plexiglass and has a reinforcing clicking sound so the child knows when the switch has been pressed. Project ACTT disseminates a videotape and manual, *Constructing a Battery Interrupter and a Tread Switch*, that demonstrates how to make a simple, inexpensive tread switch.

The Pillow Switch: Another pressure activated switch is the pillow switch. This soft, sensitive switch can be activated by a slight press of a hand, finger, head, or foot. The cover on the pillow can be changed to add tactile or visual stimulus.

The Ribbon Switch: The ribbon switch is a long, flexible band that can be activated by a sweeping motion of the hand or a direct grasp, pull, or push against it. The ribbon switch can also be mounted in wood blocks to provide stability or can be covered with tactilely or visually stimulating materials.

The Mercury Switch: The mercury switch, a versatile switch that can be used with various types of body positions, is often attached to a headband or armband and is activated when mercury moves across contact wires in a capsule. When attached to a headband, the mercury switch can be designed to activate when it moves to the midline or to either side of the midline.

Encouraging independent learning is the goals of any switch activity. Independent learning can be enhanced using switches coupled with software programs and/or modified toys to foster the child's realization that he has impact on or control over his environment. Learning then becomes more enjoyable, and the child develops an eagerness to participate in learning activities. Most importantly, the child and his family realize that his disability need not prevent him from independently impacting his environment.

Source: Building ACTTive Futures, ACTT's Curriculum Guide for Young Children and Technology, Macomb Projects, College of Education, Western Illinois University, Macomb, IL 61455.

SWITCH USE

TOPIC: **SWITCH USE**

OVERVIEW: This module provides an overview of the use of switches by young children with handicaps. It demonstrates different types of switches and their use with battery-operated toys and environmental controls.

TIPS TO THE LEADER: This module can be conducted using any variety of switches. The main objective of the module is to show how all switches work to change or control an object. The handouts describe common switches and switch interfaces.

If participants are novices, you might want to allot more time for hands-on activities with switches. This could be a full morning workshop where participants learn to make and use switches.

REQUIRED SKILLS: None

OBJECTIVES:

1. To provide a purpose for using switches with young children
2. To name and operate different types of switches
3. To operate toys and appliances adapted for switch use
4. To name and operate different type of switch interfaces

MATERIALS:

Hardware — for leader and each team:
- Various switches: Plate, flat, mercury, leaf, or others
- Switch toys
- Common household electrical appliances (i.e., blender)
- Various switch interfaces

Handout Packet H-12:
- H-12-1, Commonly Used Switches
- H-12-2, Switch Interfaces

KEY POINTS/ ACTIVITIES:

1. Purpose for using switches with young children

1a. Explain to the participants that switches are tools which increase a child's ability to actively participate in leisure, domestic, vocational, and community activities by controlling electrical toys and appliances with a single movement.

1b. The use of switches helps a child with handicaps participate in his world and control elements of his environment.

1c. When using a switch just like any other educational material, there should be a purpose for its use. For example, one purpose or goal for using a switch toy with a young child, would be to increase that child's attention span.

2. Different types of switches

H-12-1

2a. Distribute *Handout H-12-1, Commonly Used Switches* to each participant. Recommend that participants use this handout to follow along as each switch is introduced. The handout can also be used for note taking and future reference.

2b. Arrange several switches in front of participants. A switch is a device a child uses to control an electronic object. By activating any one of these switches, a child with physical handicaps can learn to control toys or objects in his environment. Any battery-adapted toy can be modified to work with a switch.

2c. Switches are activated by a controlled physical movement. This needs to be a reliable, consistent muscle movement such as the press of a hand, turn of the head or the blink of an eyelid. It is important to assess a child to find which is his most successful movement to make switch use successful.

2d. Select one adapted battery-operated toy and demonstrate the use of different switches with the toy. Identify and discuss each switch as it is introduced. Give the participants an opportunity to use the switches.

2e. Further information on the use of switches can be obtained from switch vendors or special projects (see Reference section).

3. Toys adapted for switch use

3a. Explain to the participants that toys can be permanently adapted for switch use by vendors or by individuals. Refer to the Reference section for more information.

3b. Introduce several toys that have been permanently adapted for switch use. Allow participants an opportunity to use each toy with several switches.

3c. Battery-operated toys can be adapted temporarily or permanently. Using a copper wafer connection, demonstrate a temporary adaptation of a toy for switch use.

4. Switch interfaces

H-12-2

4a. Distribute *Handout H-12-2, Switch Interfaces* to the participants, and explain that a switch interface is a connection between a toy or appliance to a switch. Interfaces can allow several different options for the child.

4b. For example, switches interfaced with a timer allow toys or appliances to stay on for a predetermined length of time once the switch is activated. This may be an important function for children who do not have the necessary motor control or strength to sustain pressure on the switch.

4c. An Environmental Control Unit allows electric devices to be activated by a switch. Common household appliances can be easily adapted for switch use. Any appliance that uses a plug can be used with a switch. Show and demonstrate the use of the Environmental Control Unit with an electrical appliance. Plug the appliance into the unit and plug a switch into the jack on the control unit. Demonstrate the use of the appliance with a switch.

4d. Allow participants an opportunity to operate the timer or Environmental Control Unit with several toys and appliances.

4e. Some switches can be used as input devices for computer programs. In addition, these same switches can be used as an input method to the computer allowing a child to control any software program.

CONCLUSION: This module introduces switches and switch interfaces. Participants are able to operate appliances and toys adapted for switch use.

REFERENCES:

Branderburg, S. A. & Vanderheiden, G. C. (Eds.). (1987). *Communication, control, and computer access for disabled and elderly individuals. Resource Book 2: Switches and environmental controls.* Boston, MA: College Hill Press.

Levin, J. & Scherfenberg, L. (1986) *Breaking Barriers.* Minneapolis, MN: ABLENET.

Levin, J. & Scherfenberg, L. (1987). *Selection and use of simple technology in home, school, work, and community settings.* Minneapolis, MN: ABLENET.

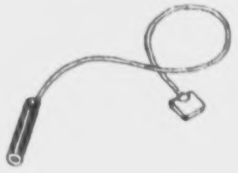
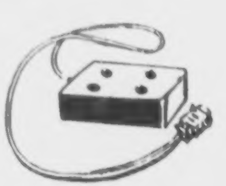
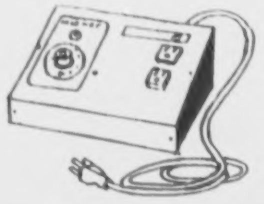
RESNA. (1982). *A guide to controls. Selection, mounting, application.* Washington, DC: Author.

R-12-1. Switch Vendors.

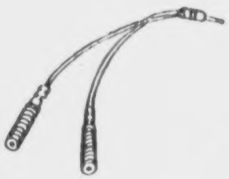
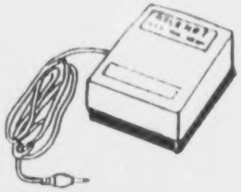
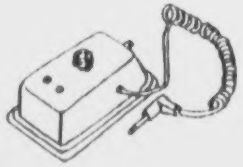
R-12-2. Resources for Adapting Battery Operated Toys.

Source: Preschool Integration Through Technology Systems, (PITTS), United Cerebral Palsy Association of Western New York, Inc., 4635 Union Road, Buffalo, NY 14225; US DOE Grant #H024E80010

OVERVIEW OF COMMONLY USED SWITCH INTERFACES

NAME	EXAMPLE	ACTION IT MODIFIES	COMMENTS	VENDORS
Battery Device Adaptor		Allows a battery operated device to be activated by switch	• non-permanent • can be used with most on/off toys, radios, and tape recorders	Ablenet Don Johnston Kanor
Computer Switch Interface		Allows single switch access to an Apple computer	• accepts 1 or 2 switches • substitutes switches for joysticks	Ablenet Don Johnston TASH
Control Unit		Enables electrical devices to be activated by a switch	• allows children to participate with peers • used with continuous closure or on/off • timer can be set 2 to 90 seconds	Ablenet Don Johnston TASH

Source: Preschool Integration Through Technology Systems, (PITTS), United Cerebral Palsy Association of Western New York, Inc., 4635 Union Rd., Buffalo, NY 14225; US DOE Grant #H024E80010

NAME	EXAMPLE	ACTION IT MODIFIES	COMMENTS	VENDORS
Series Adapter		Connects 2 switches and 1 toy. Both switches must be activated at the same time	• encourages bilateral movement • promotes cooperation between 2 children	Ablenet HCTS Kanor
Switch Latch Interface		Turns the device on and then off with each switch activation	• good for children who are unable to maintain switch closure for a length of time	Ablenet Don Johnston HCTS Kanor
Timer Module		When switch is closed, a toy is activated for a pre-set time	• depending on vendor, toy activates for 1 to 90 seconds	Ablenet HCTS Kanor

Adapted for use from the Technology/Learning/Collaboration Project, Grant #H024C8002288

SWITCH IDEAS

These ideas have been pulled from many different sources. In designing activities that involve switches you are limited only by your imagination. Be creative!

Hook Battery Device Timer (Ablenet) between the switch and the reinforcer. This way the battery-operated toy/tape recorder stays on for a set length of time. This allows a child who cannot sustain pressure on a switch to get reinforced for pushing the switch. This also gives a child more involvement and control over an activity since he/she needs to keep pressing the switch for the activity to continue. They aren't simply watching something that someone else turned on.

The child could use his/her switch and a tape recorder to start songs during music time. Record 15 seconds (or any set amount of time) of each song. Set the Battery Device Timer (if using battery-operated tape recorder) or switch control unit (if using tape recorder that plugs into box) to 15 seconds so that when the child pushes the switch the song starts and the rest of the class joins in. The child does not push the switch again until it is time to sing the next song.

Use the switch-operated drum so the child has an instrument during music time.

When the classroom is making a "band" let the child with the switch and tape recorder start the music and the other children can play along.

Use a switch control unit (Prentke Romich Company, Ablenet, etc.) so small AC appliances can be controlled by a switch. Need to make sure that voltage does not exceed the abilities of the control unit. Blender, blow dryer, radio, small TV, fan, light, tape recorder, mixer, popcorn popper, etc. can be used. Use your imagination! This will allow child to participate in age appropriate activities, help out around the home, help make snack, etc.

During snack time a switch control unit can be used so that the switch controls a blender, mixer, or other small appliance. Let every child in the room use the switch to take turns controlling the appliance.

Other ideas for small appliances and the switch control unit:

- Fan — blow the air at people, blow something up in the air, talk/sing into the fan, hold bubble wand in front of the fan to blow bubbles, tie colored streamers onto the fan
- Colored lights, Lite Brite, Light box, Christmas tree star
- Blow dryer — play game of blowing cotton balls/ping pong balls across the table, blow air at people, toy boats across water, pinwheels, target shoot
- Radio, small TV, small vacuum cleaner, almost any small appliance will work

Record directions for Simon Says on a tape. Make each direction be a set amount of time (such as five seconds). Set the switch timer for five seconds. Then when the child presses the switch a direction is given to the class.

Patti J. Place, M.A., CCC-SLP

Family Child Learning Center, Tallmadge, OH 633-2055

3/20/91

Stories recorded on cassette tapes (either purchased or recorded by a family member) can be used for recreation/leisure.

Switch can be used to control a battery-operated Spin Art during art activities.
  Make spin art notecards
  Paint on leaves
  Put glue on paper and drop glitter or pieces of tissue paper while it is spinning

Use the Spin Art for a spinner for a game — put numbers or colors on an overlay and attach a pointer to the spin art. The child moves the number of spaces shown or to the color that was highlighted.

Some games which are battery-operated may be very appropriate to make switch operable such as Bed Bugs.

The child's teacher can record messages about the child's day for he/she to "tell" the family at home. Parents can record messages for the child to "tell" the teachers and children at school.

Child could press a switch to turn on a light or make a sound to signal the start of a race.

Use switch with a slide projector. Each switch press advances the carousel one picture. Could be used for recreation/leisure, to show slides for show and tell, for group learning activity, etc. Slide projector adaptor available through Ablenet.

Child can use the switch, Battery Device Timer, tape recorder, and an answering machine loop tape for communication. Record a message on the tape and put a picture corresponding to the message on/near the switch. Messages could be:

  "Come here" — to request attention
  "More please" — to request more food, actions, toys
  "Help"
  "I'm finished"
  "My turn"
  Anything appropriate to a situation

Think creatively about activities you can do with a toy rather than just letting the child sit there and watch the toy go:

Car/Truck	Drive into the garage (shoe box) Knock down a wall/tower of blocks Deliver or pick up small toys or snacks
Kitty	Walk to food Crawl under a blanket Kick the blanket off Walk off of the table
Crawling Baby	Crawl to bottle to eat, book to read, blanket to sleep, etc. Have a baby race with two crawling babies

Have two children with toys and switches. Let the toys "chase" each other.

For outdoor summer play get a battery/switch-operated squirt gun (Handicapped Children's Technological Service makes a squirt gun and an elephant that shoot water *30* feet).

At Halloween — create a switch-controlled haunted house. Children use switches, tape recorders, switch control units to control the lights, scary noises, and scary music.

For musical chairs allow the child using a switch to control the music.

Use toys appropriate to the unit or theme the class is working on so that the toys are related to ongoing activities.

Have the student use a switch and tape recorder to give the directions/explanation for an ongoing activity. (I know of a student who did this to describe the magic trick she was doing as part of the school magic show.)

Barrett School has developed a switch-operated bowling ramp. Barrett School is in Akron, Ohio.

LEVEL: GENERAL

GOAL: **#2** Become familiar with switch application as a means of allowing young children with disabilities greater opportunity for independent control and participation.

COMPETENCY TYPE: SKILL

OBJECTIVE: Participants will operate toys and appliances adapted for switch use and identify resources for these materials.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
1. Individual or small group activity Give participants the opportunity to use the various switches, switch interfaces, toys, and appliances.	1. Various switches: plate, flat, mercury, leaf, or others (available from SERRC or ORCLISH). Various switch interfaces (also available from SERRC or ORCLISH). Common household electrical appliances (tape recorder, fan, blender). Switch toys (permanently and temporarily adapted). If resources are available: Computers, switches, switch interfaces, and single-switch software.	1. If possible, obtain toy(s) that would be of greatest interest to young children, such as: – Plush Fancy Feet Caterpillar that walks, with eyes/antennae that light up. – Robot that walks with moving arms and eyes that light up. – Plush Pig that walks with sound and wagging tail. – Climbing Fireman.
2. Large group activity Provide Handout G-H6 listing sources for obtaining these materials.	2. Handout (G-H6) *Switch Resources*	2. This opportunity for participants to experience the increased opportunities created through switch activation will be *greatly* enhanced if you include at least one computer equipped with a switch, switch interface, and piece(s) of single-switch software. (See Supplemental Resources on switch use.)

SWITCH RESOURCES

Don Johnston Developmental Equipment, Inc.
P.O. Box 639
1000 N. Rand Road, Building 115
Wauconda, IL 60084
800/999-4660 or 708/526-2682

Zygo Industries
P.O. Box 1008
Portland, OR 97207
800/234-6006 or 503/297-1724

Linda Burkhart
8503 Rhode Island Avenue
College Park, MD 20740

ABLENET
1081 10th Avenue S.E.
Minneapolis, MN 55414
612/379-0956 or FAX 800/322-0956

ComputAbility Corporation
40000 Grand River, Suite 109
Novi, MI 48375
800/433-8872

Creative Switch Industries
P.O. Box 5256
Des Moines, IA 50306
514/287-5748

Tapeswitch Corporation
100 Schmitt Blvd.
Farmingdale, NY 11735
516/694-6312 or FAX 516/694-6304

Prentke Romich Company
1022 Heyl Road
Wooster, OH 44691
800/642-8255 or 216/262-1984
(Ohio residents call collect)

TASH, Inc.
70 Gibson Drive, Unit #12
Markham, Ontario L3R 4C2
Canada
416/475-2212 or Telex 06-986766 TOR

Asahel Engineering, Inc.
N.E. 820 California Street
Pullman, WA 99163
509/332-2205

Toys for Special Children, Inc.
(Steven Kaynor)
385 Warburten Avenue
Hastings-on-Hudson, NY 10706
914/478-0960

Regenesis Development Corporation
1046 Deep Cove Road
North Vancouver, BC V7G 1S3
Canada
604/929-2414

Adaptive Equipment for the Handicapped
P.O. Box 496
Ocean Park, ME 04063-0496
207/934-2952

DU-It Control Systems Group, Inc.
8765 Twp. Rd 513
Shreve, OH 44676-9421
216/567-2906

Behavioral Engineering
230 Mt. Herman Road
Scotts Valley, CA 95066
408/438-5649

Adaptive Communication Systems, Inc.
Box 12440
Pittsburgh, PA 15231
412/264-2288

Arroyo & Associates, Inc.
2549 Rockville Center Parkway
Oceanside, NY 11572
516/763-1407

KY Enterprises/Custom Computer Solutions
3039 E. 2nd Street
Long Beach, CA 90803
213/433-5244

Technology for Language and Learning
P.O. Box 327
East Rockway, NY 11518-0327
516/625-4550

Luminaud Switches
8688 Tyler Blvd.
Mentor, OH 44060

Source: Building ACTTive Future, ACTT's Curriculum Guide for Young Children and Technology, Macomb Projects, College of Education, Western Illinois University, Macomb, IL 61455.

LEVEL: GENERAL

GOAL: #2 Become familiar with switch application as a means of allowing young children with disabilities greater opportunity for independent control and participation.

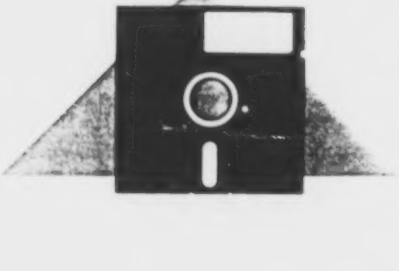
COMPETENCY TYPE: VALUE/ATTITUDE

OBJECTIVE: Participants will identify positive benefits of switch use for children with physical or cognitive limitations.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
1. Large group activity Review with participants that switches are tools which allow a child with a physical or cognitive disability to actively participate in leisure, domestic, vocational, and community activities by controlling toys, appliances, or a computer with a single movement.		
2. Large group activity Ask each participant to identify a young child with special needs. Determine an activity in which that child is currently unable to participate. Have participants suggest possible switch applications that would facilitate participation. Discuss the individual benefits that may derive from switch use. List them on a flip chart to illustrate the many ways that the child will benefit. The leader should be sure to discuss benefits such as greater independence, heightened self-esteem, increased social opportunities, ability to participate in more activities, etc.	2. Flip chart and large colored marker	2. See Handout G-H3, *Switches* and Handout G-H5, *Switch Ideas* for references to these concepts.

GOAL 3

Technology



LEVEL: GENERAL

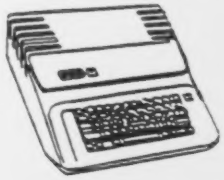
GOAL: **#3** Gain introduction to basic use of computer and peripherals with young children who have disabilities.

COMPETENCY TYPE: KNOWLEDGE

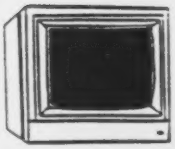
OBJECTIVE: Participants will learn that the computer and peripherals can be used in various ways to meet the individual needs of young children with special needs.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
1. Large group activity Using Handout G-H7, *The Computer System: Standard Components* as a reference, review the basic components of the computer system. If audience has little or no experience with Apple II computers, leader may review *briefly* general concepts covered in Leader Notes. Explain that it is the input of information by the standard keyboard that causes young children problems. Small hands have a hard time reaching and typing keys. Young children are usually nonreaders and nontypists which also makes the keyboard inappropriate. Young children with physical or cognitive limitations may display even stronger needs for an alternate means of input.	1. Handout (G-H7) *The Computer System: Standard Components* Leader Notes (G-L1-6) *Introduction to the Computer System* (training module from PITTS) *Glossary* (of Computer Terminology) *Computer Tips** *Starting Up a Software Program** *Caring for Disks** *Adaptive Firmware Care*	1. For more in-depth general information on the computer, leader can refer to the Leader Notes. *These may be appropriate also as Handouts if audience does not have experience with Apple II computers.
2. Large group activity Show the video *Adapting the Computer*	2. Video *Special Friends and Computers: Adapting the Computer* This video is from PITTS and will probably be available at your local SERRC.	2. Point out various peripherals as they are shown in the video. Ask participants to identify specific advantages that appear to provide young children in providing access to the computer.

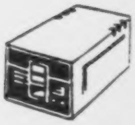
THE COMPUTER SYSTEM STANDARD COMPONENTS



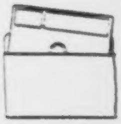
The **COMPUTER** is the processing unit, memory, and power supply source of the computer system. It is also referred to as the Central Processing Unit (CPU).



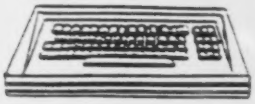
The **MONITOR** provides a visual display of the information being processed by the computer. The information can be words or pictures. Color monitors are suggested for use with preschoolers. The monitor attaches to the computer with a video cable. Unlike televisions, sound is not controlled through the monitor; it provides video output only.



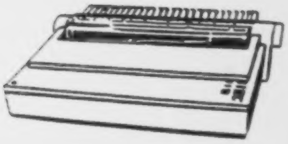
The **DISK DRIVE** is a device that reads the program information stored on a disk. After a disk is inserted and the power turned on, the disk drive loads the program into the computer's memory so that it can be used.



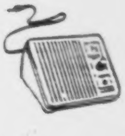
The **DISK** is a storage medium of programmed information. It is the software program that the computer reads and responds to.



The **KEYBOARD** is the standard input device similar to a typewriter, which sends information to the computer by typing letters, numbers or commands. Keyboards can be built into the computer console (Apple IIe) or attached to the computer with a cable (Apple IIGS).



The **PRINTER** is a device which produces paper or a "hard" copy of the information developed using the computer. Several preschool programs offer a color print-out option; a special printer and color ribbon is required. The printer connects to the computer through an interface card and cable.



The **ECHO SPEECH SYNTHESIZER*** is a device which connects to the computer with an interface card and cabled speaker. It provides speech output for programs specifically designed to work with the Echo.

*The Echo Speech Synthesizer is not a standard component of the computer system. However, it is highly recommended to be used with preschoolers, to enhance their software programs.

Source: Preschool Integration Through Technology Systems, (PITTS), United Cerebral Palsy Association of Western New York, Inc., 4635 Union Road, Buffalo, NY 14225; US DOE Grant #H024E80010.

INTRODUCTION TO THE COMPUTER SYSTEM

OVERVIEW:

This module provides an introduction to computers and related components. Specifically, participants learn to recognize standard input and output components of the computer and are introduced to alternate input devices and enhancements. Sections on care, maintenance, and efficient use of the computer system are included.

TIPS TO THE LEADER:

As this is a basic introduction to the computer, it can be used as a precursor to any of the following technology modules. It is designed for the novice. The length of time suggested for this module does not include time for participants to start up software independently. You may want to lengthen the module depending on the needs of your audience. If the majority of the participants are extensive computer users, this module may be introduced as a reference module. The booklet, found in Appendix B, provides the structure of the module and is entitled "An Introduction to the Computer System". This booklet is a great resource to utilize when training others. It should be distributed to all participants either novice or user level.

REQUIRED SKILLS:

None

OBJECTIVES:

1. To define components of the standard computer system
2. To define alternate input devices
3. To illustrate connector areas on the computer
4. To list methods to use in caring for disks
5. To demonstrate steps necessary to start up a software program
6. To list ways to care for the computer system
7. To list suggestions for tips on organization, software, and hardware use

MATERIALS:

Hardware — for leader:
    Apple IIe Computer system with color monitor and printer
    Echo IIb Speech Synthesizer
    Touch Window
    Power Pad
    Switch

Software — for leader:
    Preschool software program

Handout Packet H-6:
    (Appendix B)
    Booklet: An Introduction to the Computer System

KEY POINTS/ ACTIVITIES:

1. Standard computer components

1a. Point to the computer system and explain that the Preschool Integration Through Technology Systems (PITTS) Training centers around the use of Apple computers. These computers are recommended for several reasons:

- They are easy to adapt to the needs of young children with physical handicaps.
- The majority of preschool software is currently designed for Apple computers.
- Apple computers are the most frequently used computer model in the elementary school setting; a setting which these preschoolers will soon enter.

Appendix B

1b. Distribute booklet found in Appendix B, *An Introduction to the Computer System*, to the participants. Recommend that they use it for future reference. Explain and demonstrate that the booklet contains information on standard computer components and alternate input devices, along with other helpful information. The use of devices is explained in full during future modules. The purpose of this session is to provide a general overview of the computer.

1c. Using the computer system for demonstration, point out the various standard components and describe them by using the booklet information as a guide. The standard components include: the computer (the central processing unit), monitor, keyboard, disk drive, disk, and printer.

1d. Point out to the participants that the Echo Speech Synthesizer is not a standard part of the computer. It is an enhancement which is recommended as an integral component in computer use with young children with handicaps and their non-handicapped friends.

2. Alternate input devices

2a. Explain to the participants that it is the input of information by the standard keyboard that causes young children a problem. Small hands have a hard time reaching and typing keys. Plus, young children are often nonreaders and non-typists, which makes the keyboard an inappropriate choice for them. Fortunately, there are many ways to adapt the computer to make it easier.

2b. With two or three different devices available for demonstration, explain that these alternate input devices help to provide successful computer experiences for young children. The following devices, plus others, are described in the booklet.

- Touch Window: This device mounts onto the monitor. A child simply touches the screen to use the software program.
- Power Pad: The surface of this device changes with each piece of software. Show different overlays and explain that the press areas are defined for each program.

- Switch: This device is used by very young children and people with physical disabilities. A single press permits the user to run a software program.

2c. Remind the participants that all of the input methods shown in this module are discussed at length in separate modules.

3. Computer connection areas

3a. Explain to the participants that these input devices and computer enhancements, such as the Echo Speech Synthesizer, must be connected to the computer in some way. There are several ways to do this. This information is clearly illustrated in the booklet as part of each device description.

3b. Assemble the participants around a computer (CPU) to demonstrate the connector sites. Explain that there are two I/O (in/out) ports found on the Apple computer. Several devices plug into these ports.

3c. Turn the computer around and locate the 9 pin I/O port on the back of the computer. Explain that devices such as joysticks and the Touch Window connect here. Demonstrate the plug-in using one of the devices.

3d. Explain that another port is used for devices with 16 pin heads, such as the Power Pad or Koala Pad. This 16 pin I/O port is found inside the computer. Reassure the participants that this information is clearly illustrated in the booklet.

3e. Take the top off the computer. Locate the 16 pin I/O port on the upper right corner of the motherboard. Show a cable with a 16 pin head to the participants and explain that an extender port can be used so that you don't have to open the computer each time you want to use the Power Pad.

3f. With the computer open, point out other parts of the computer: the motherboard, power supply box, and the seven expansion slots.

3g. Explain that these expansion slots can be used for additional enhancements to the computer. A circuit card is placed in a slot so as to use the capabilities of the computer. Describe and demonstrate available cards and their functions or use the following as examples:

- For the printer to receive directions from the computer, a circuit card is added to slot one. A cable then connects the printer to the card.
- The Echo Speech Synthesizer is a circuit card and speaker system. The card is inserted into an expansion slot and the speaker box is attached to the card with a cable.
- Other cards can be used for extending the memory of the computer, modem use in transferring information over telephone lines, or adding other input devices that do not plug into one of the ports (light pens, mouse, etc.).

3h. Replace the top of the computer. Tell the participants that they will have the opportunity to plug in devices and install circuit cards during other modules.

4. Caring for disks

4a. Demonstrate a disk to the participants. Remind them that the disk is what provides the versatility to the computer. Information that the computer will use is stored on the disk. Point out the shiny film and explain that the information (data) is stored on the surface of this magnetically coated film. A vinyl covering called a "jacket" protects the film.

4b. Suggest that the participants find the section in the booklet entitled "Caring for Disks." Discuss each point. Field any questions.

5. Starting up a software program

5a. With the participants seated in front of the computer system, explain that steps necessary to start up a software program will be demonstrated. This is a review for individuals who have used software prior to this training.

- Make sure the computer is off.
- Remove the disk from the paper envelope by holding the label end.
- Slowly insert the disk into the disk drive and close the door.
- Turn on the computer, either by turning on the computer and monitor separately, or by activating the switch on the surge protector.

5b. Explain that this process is also know as "booting" a disk.

6. Caring for the computer system

6a. Explain that the computer system is a rugged machine that should provide years of service. Careful use and regular maintenance can extend the life of any machine.

6b. Instruct the participants to find the section in the booklet entitled "Caring for the Computer System". Review and discuss each point. Ask participants for other suggestions. Field any questions.

7. Helpful hints

7a. Explain that there are several additional pieces of information to know when using computers. The "hints" listed in the booklet under "Computer Tips" are grouped under three categories and are the result of a survey of a variety of computer users. The three categories include: organization, software, and hardware.

7b. Instruct the participants to locate the section in the booklet. Discuss each point, and ask the participants for other suggestions. Field any questions.

CONCLUSION: This module provides an overview of the computer system. The Apple computer's adaptability and wealth of software makes it an ideal choice for use with young children with handicaps and their non-handicapped friends.

Source: Preschool Integration Through Technology Systems, (PITTS), United Cerebral Palsy Association of Western New York, Inc. 4635 Union Rd., Buffalo, NY 14225; US DOE Grant #HO24E80010

GLOSSARY

This glossary contains terms used frequently in relation to computers. Knowledge of computer terminology leads to a better understanding of computer literature and improves communication with others in the field.

Adaptive Firmware Card: The Adaptive Firmware Card is a multipurpose peripheral card which allows for modification of the method of input and rate of presentation for many commercial software packages. A primary function of the Adaptive Firmware Card is to enable individuals for whom the computer's keyboard is inappropriate to use commercial software with a single switch. In addition, it allows for other methods of input including scanning, Morse code, and adaptive keys.

Adaptive Keyboard: Adaptive keyboards are generally attached to the computer with firmware cards. These keyboards are usually programmable and enable the user to send information to the computer in different forms. For instance, one key can be the equivalent of an entire word or phrase or representative of a functional command.

Backup: A backup is a duplicate made of a disk/file and kept on hand to avoid the loss of or damage to crucial data. It is highly recommended that backup copies be made for heavily used or favorite programs while the originals are kept on file.

Boot: The process of turning the computer on and loading a program into the computer's memory is known as a "boot." Reference is sometimes made to "cold or warm boots." A cold boot is performed when a program is loaded by turning on the computer. A warm boot is done by clearing one program from memory and loading another without turning the computer off.

Bug: An error in a computer program which keeps the program from running correctly.

Byte: A series of eight bits that represents a character, instruction, letter, or number to the computer as a unit of measure for computer memory.

CD ROM: Information is permanently burned into a disk using laser beams. A mold is made from a master disk and plastic copies are duplicated from the mold. The disks, about 4¾″ in diameter, are read by a laser beam in a CD-ROM drive that is attached to the computer. Because you cannot erase information on a CD-ROM disk, it is ideal for storing databases and other large amounts of information.

Central Processing Unit: The CPU is the main brain of the computer. It is the unit in the computer that processes data, stores data, and retrieves data from memory. When the CPU consists of only one chip, it is called a microprocessor.

Character: A character refers to any letter, punctuation mark, space, or digit used to represent information.

Chip: A chip is an integrated circuit containing microscopic switches etched in a small piece of silicon. These chips carry out the processing of data. Chips may hold data permanently or temporarily. They often look like thin, black rectangular boxes with spike-like connectors coming out of the bottom. They either plug into or are soldered into the circuit boards of the computer.

Click: To position the pointer on an object on the screen, then press and quickly release the mouse button.

Clipboard: The holding place for information that was last cut or copied; a buffer area in the computer's memory.

Computer Assisted Instruction (CAI): CAI refers to instruction which is conducted or augmented by a computer. CAI software includes drill and practice, tutorials, simulations, problem solving, and educational games.

Computer Managed Instruction (CMI): CMI is intended to make instruction management and record-keeping easier and more efficient. These are teacher-oriented rather than student-oriented programs. For example, the computer might keep records, test results, and progress reports; the computer might generate materials (IEPs) or test students and prescribe appropriate work.

Crash: A crash occurs when a program quits working as it should or the disk is damaged. Most often a crash is permanent damage to the data on a disk, but in some instances it can be a temporary problem due to static or incorrect disk drive speed.

Cursor: A cursor is a small, often blinking, symbol which appears on the monitor. It indicates that the computer is waiting to receive information.

Daisy-chain: To connect a series of peripherals (e.g. disk drives) to the computer. The first is connected directly to the computer; the second is connected to the first, and so on.

Debugging: Debugging is the process of looking for and removing the bugs or errors from a computer program.

Disk: A disk (also known as a diskette or floppy disk) is a piece of magnetic storage material similar to recording tape. It is enclosed in protective covering and is used to store computer programs or data. A 5.25″ disk has the storage capacity of 143K (or about 70 pages of text). A 3.5″ disk has the storage of 800K (or about 400 pages of text).

Disk Drive: A drive is a mechanical device that stores information on and retrieves information from a disk.

Disk Operating System (DOS): This program informs the computer how to use a disk. It tells the computer how to distribute information on the disk and how to read information from the disk.

Documentation: Documentation refers to the instructions or manual which accompanies commercial software programs.

Expanded Memory: Expanded memory refers to added memory, which gives more RAM storage to the computer. (see **Memory, RAM, ROM**)

Firmware: Sometimes considered "hard software," these chips can be found on firmware cards placed in the expansion slots of the logic board. Firmware contains instructions in ROM to operate peripheral devices (e.g. speech synthesizers).

Firmware Card: (see **Interface Card**).

Game Port: (see **Port**).

Graphics or Touch Tablets: Input devices that transfer an image created on a touch sensitive workspace to the computer monitor. A software program and stylus accompany this flat, tracing pad type peripheral. Some instructional software is also available and requires the user to press an area on the pad to operate the program. The area is usually defined with an overlay which is placed over the activation area of the touch tablet.

Hard Copy: A printed copy of the computer program or text.

Hard Drive: A hardware device installed inside or outside of a computer which can store very large amounts of information. Commonly 10MB, 20MB, 40MB, or 60MB.

Hardware: Hardware refers to the electronic and mechanical components which make up the computer system. These usually include the computer, monitor, disk drive, and printer.

Hypercard: This complete visual information center allows you to customize, organize, retrieve, and deliver information. Like a Rolodex card system, one single card contains a set of specific information. Using hypercard they can be combined to create stacks which can contain text, sound, and graphics.

Hypermedia: Software developed by an author or publisher using hypercard functions that gives you ready made hypercard applications. (e.g. **Hyper Studio**).

Icon: (1) A graphic symbol on the back panel of the computer or its connecting cables which indicates where a device is to be connected. (2) In mouse-based applications, a graphic symbol on the screen that represents a disk, a document or file, or anything that can be selected.

Initialize: Initializing (formatting) electronically divides the disk into sectors and tracks which the computer uses for areas of data storage. When a disk is initialized or formatted, it is prepared to receive data. Caution should be used when initializing a disk since any information already on the disk being initialized will be erased.

Input Device: An input device is a component or peripheral which allows the user to enter information into the computer. The most common input device is the keyboard. Alternative input devices include switches, touch tablets, joysticks, paddles, and adaptive keyboards.

Interface: A device which allows the computer to communicate and work with another device (such as a printer). The term also refers to the physical place where the two are connected.

Interface Card: A circuit board which is inserted into one of the expansion slots of the computer which enhances the capabilities of the computer (for example: FingerPrint®, Adaptive Firmware Card™, or Echo™).

Joystick: Commonly used for games, this input device has a control stick and two buttons. Rotating the stick moves the cursor (or action figure) in a 360 degree circle. The buttons can be used to control other features of the program.

K: In reference to computers, K stands for kilo or 1000 (actually 1024) units of memory/storage. These units are counted in bytes; therefore, a computer of 64K has the storage area for 64 kilobytes of data.

Keyguard: A device that covers the keyboard and allows the users to move their hands over the surface without accidently activating the keys. The keyguard also provides direction for a finger or prod.

Language: A programming language is a set of commands which can be used to instruct the computer to perform specific tasks. Three of the most popular languages used in education are BASIC, Pascal, and LOGO.

Logic Board: This is the main circuit board in a computer and is sometimes called the **Mother board**. It contains the central processing unit (CPU), RAM, ROM, and other specialized chips and circuitry.

Medium or Media: Any material which can store data and/or programs can be called a medium. Examples include disks, punched cards, and cassettes.

Megabyte: A unit of measure for computer memory. One megabyte equals 1,048,576 bytes or characters.

Memory: Chips in the computer which have the capacity to store information. (see **RAM** and **ROM**)

Modem: A modem is a peripheral device which allows a computer to transmit and receive data from another computer over telephone lines. The word modem is derived from the words MOdulate/DEModulate.

Mouse: A computer device that controls the pointer on the screen. Rolling the mouse on a flat surface next to the computer causes the pointer to move correspondingly. The button on the mouse is used to select an icon or a computer function from the menu.

Output Device: Output devices, including monitors, printers, speech synthesizers, and robots, receive information produced by the computer and make it available to the user in an understandable form.

Paddles: Paddles are input devices which operate by turning one or both dials or by pressing the buttons. Often used for games, one dial moves the cursor (or action figure) horizontally and the other vertically. Some programs require the user to control the action using only the buttons.

Peripheral: A hardware device which is outside of, but connected to, the computer is called a peripheral. These include input and output devices such as joysticks, paddles, graphics or touch tablets, adaptive keyboards, printers, speech synthesizers, and robots.

Port: A socket on the back panel or on the logic board of the computer for connecting peripheral devices.

Printer: An output device for printing data onto paper. There are several types of printers. A dot-matrix printer is an impact printer which prints characters and graphics composed of dots. A daisy wheel printer is a letter quality, impact printer which prints pre-formed characters that are located on a printwheel or ball. A laser is a non-impact printer which uses a laser to make high-quality impressions.

Program: A program is a set of instructions, written in a language the computer understands, which allows the computer to perform a function or task.

Public Domain Software: Software that is not copyrighted.

Random Access Memory (RAM): A temporary storage area for programs and data. This information can be easily altered or deleted. When the computer is turned off, this information is erased. Therefore, data of this sort is stored on disk or cassette and retrieved when needed.

Read Only Memory (ROM): This information is stored permanently and remains available for the computer to use. It may not be altered or erased. It usually includes operational instructions for the computer such as the program to boot the computer and a computer language such as BASIC. This information is not lost when the computer is turned off.

Scanning: To automatically step through allowable responses which users select by activating a switch.

Shareware: Public domain software you can try out. If you like it and decide to use it, you send a donation or stipulated fee (usually small) to an address indicated in the program.

Slot: A long, narrow, numbered (1-7) socket on the logic board of the computer where interface cards are inserted.

Software: The programs used by the computer. Programs on both 3.5" and 5.25" disks are referred to as software.

Speech Synthesizer: Speech synthesizers are output devices which enable computers to "speak" by converting text characters into artificial speech.

Switch: A hardware device used in place of the standard keyboard that allows people who have little motor control to use the computer.

Switch Interface: Hardware that allows the switch to be connected to the computer.

Text-to-Speech: Speech output equipment that will pronounce whatever text is input.

Touch Tablet: A flat-surfaced input device. By touching the surface, the users generates input to the computer.

Word Processing: Writing, editing, formatting, and printing of text and documents on a computer system. These programs allow for easy insertion, deletion, and movement of text which permits full revision and print out in a short time.

Write-Enable: There is a small notch in the upper-right corner of a 5.25" disk. If the notch is uncovered, the disk is write-enabled and the user is able to add to, delete, and change information stored on it. On a 3.5" disk, the disk is write-enabled when the small piece of plastic covers the square hole in the upper-right corner.

Write-Protect: Changes cannot be made to the information stored in a write-protected disk. To prevent changes to the contents of a 5.25" disk, cover the notch. Slide the small plastic tab to uncover the square hole on a 3.5" disk to write-protect it.

Source: Building ACTTive Futures, ACTT's Curriculum Guide for Young Children and Technology, Macomb Projects, College of Education, Western Illinois University, Macomb, IL 61455

COMPUTER TIPS

ORGANIZATION

Software programs are stored on a disk and can be susceptible to damage. Take time to back up or duplicate your disk in case it is destroyed. Every disk should be backed-up to protect your software.

Copyright laws allow you to have one back-up copy of any computer program that you purchase. If you can't make a copy, contact software publisher and ask about their replacement policy.

Consult your computer Owner's Manual on copying disks. Make sure to format or initialize a blank disk before you begin. There are also commercial software programs made for this purpose.

Store the original disks in a separate case from the copies that are used.

Label each disk precisely with program, publisher, and date.

SOFTWARE

Store disks in a dust proof container that provides for ultraviolet screening.

The **RETURN** key may be required after a key selection, for an "entry" command.

The **ESCAPE** key often takes you back to the main menu.

Make sure that the **CAPS LOCK** key is down when using most software programs.

To start a disk with the power on; insert a disk into the drive and press the keys **Control/Open Apple/Reset,** all at the same time.

HARDWARE

Make sure the power is off when connecting or removing peripherals.

Only one alternate input device should be connected to the computer at one time.

When adding circuit cards or connecting peripherals to the inside of the computer, make sure to touch the power supply box before you begin.

If you are having trouble with the computer working properly, check that all the connections are secure (wall circuit, monitor, printer, peripherals, etc.).

Turn off the computer when it is not in use.

Source: Preschool Integration Through Technology Systems, (PITTS), United Cerebral Palsy Association of Western New York, Inc., 4635 Union Road, Buffalo, NY 14225; US DOE Grant #H024E80010

STARTING UP A SOFTWARE PROGRAM

1. Make sure the computer is off.

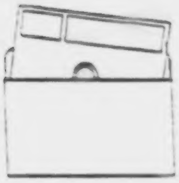
2. Remove the disk from the paper envelope by holding the label end.

3. Slowly insert the disk into the disk drive and close the door.

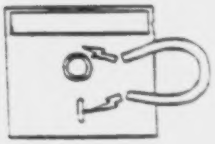
4. Turn on the computer.

Source: Preschool Integration Through Technology Systems, (PITTS), United Cerebral Palsy Association of Western New York, Inc., 4635 Union Rd., Buffalo, NY 14225; US DOE Grant #H024E80010

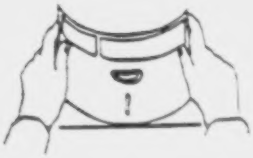
CARING FOR DISKS



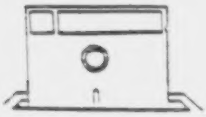
Store the disk inside the paper envelope or sleeve and then place them in the dust free container vertically.



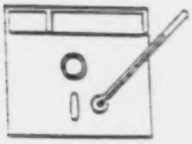
Keep your disks away from any source of magnetism like a stereo, TV, a household appliance, and even the top of the disk drive. Data is stored on the surface of magnetically coated film under the jacket of the disk.



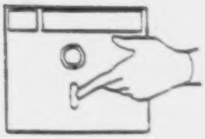
Handle the disk carefully. Bending the jacket may cause damage to the disk. Do not use paper clips on the disk.



When inserting the disk into the disk drive, be sure to put it in straight. Rough treatment can cause damage to the jacket or the disk.



Store the disk away from direct sunlight, moisture, and extreme temperatures.

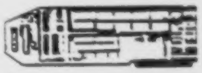


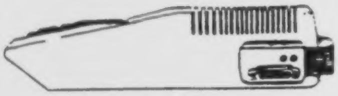
Fill out the labels for the disks before you place them on the disk itself. Do not touch the disk where the jacket does not protect it. Always handle and hold the disk by the label.

Source: Preschool Integration Through Technology Systems, (PITTS), United Cerebral Palsy Association of Western New York, Inc., 4635 Union Road, Buffalo, NY 14225; US DOE Grant #H024E80010.

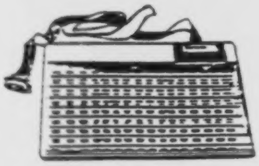
THE ADAPTIVE FIRMWARE CARD INPUT DEVICES

There is a wealth of preschool software designed for the standard keyboard that will not work with the Touch Window, Power Pad, Muppet Learning Keys, or a joystick. In order for preschoolers with handicaps to use these software programs with input devices that are more successful for them, the computer itself must be modified. By adding the Adaptive Firmware Card (AFC) to the computer, the following devices can be used with any software program designed for the keyboard.



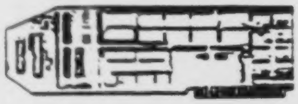


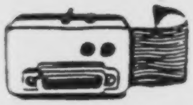
The **ADAPTIVE FIRMWARE CARD** is installed in the computer. Its control box attaches to the card and is used outside the computer as a plug-in port for the following input devices.



The **UNICORN BOARD** is a touch sensitive keyboard which allows users to customize overlays for individual software programs using pictures to indicate the correct key to select. Press areas can be large or small and positioned anywhere within the surface of the board.

NAME: **ADAPTIVE FIRMWARE CARD**





MANUFACTURER:

Don Johnston Developmental Equipment, Inc.
P.O. Box 639
1000 N. Rand Road, Bldg. 115
Wauconda, IL 60084
(312) 526-2682

DESCRIPTION: The Adaptive Firmware Card System consists of an internal printed circuit card and an I/O box. The system allows a computer to be accessed transparently by any one of 16 special input methods for people who cannot use the standard keyboard or who find an alternate input method more efficient. To use the Adaptive Firmware Card System, you need an input device (such as an expanded keyboard or switch) which you must purchase from another source.

REQUIRED SOFTWARE: The first time you install the Adaptive Firmware Card, you must use a special piece of software (included with the system) which sets up the system and tells the computer which input device you will use and its special input method. This set up allows the user to run commercial software with special input methods and rates.

CONNECTION: The circuit card fits into one of the expansion slots inside the computer. No technical expertise is required for installation. The I/O box easily mounts on the side of the computer. The switch or other input device (supplied by the user) plugs into this I/O box.

COMPUTER: Models are available for Apple computers.

APPLICATIONS: The Adaptive Firmware Card enhances the computer and allows transparent access to most software. The user can select any one of sixteen input methods depending on his or her physical ability and the type of access device. Input methods range from alternative keyboards, scanning for switch use, to morse code. The card can also slow down the response time required in interactive programs. It also permits the computer to be used as a rudimentary communication device.

PHYSICAL ABILITY: Depending on the access device used, almost any degree of pressure can be selected.

PRICE: Apple IIe with 64k (C40) $400.00, Apple IIgs (G32e) $520.00

Source: Preschool Integration Through Technology Systems, (PITTS), United Cerebral Palsy Association of Western New York, Inc., 4635 Union Rd., Buffalo, NY 14225; US DOE Grant #H024E80010

LEVEL: GENERAL

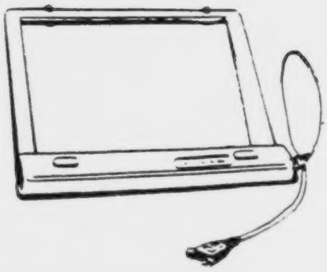
GOAL: #3 Gain introduction to basic use of computer and peripherals with young children who have disabilities.

COMPETENCY TYPE: SKILL

OBJECTIVE: Participants will identify computer components and peripherals.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
1. Large group activity Using provided Handouts on each peripherals, briefly discuss the use of each. Point out the connections on the computer.	1. Handouts (G-H8-13) *Touch Window* *Power Pad* *Muppet Learning Keys* *Echo Speech Synthesizer* *Unicorn Expanded Keyboard* *Keyboard Modifications* This experience will be *greatly* enhanced by the display of as many of the above peripherals as possible.	1. As each peripheral is discussed, address how a child with a disability would benefit. Although these peripherals may have their most direct benefit for children with physical limitations, they can benefit all young children because of their concrete nature and simplicity of use. Try to point out that children with learning or developmental disabilities can also gain more appropriate access to the computer with the usage of these peripherals. Leader may refer to the more extensive notes on each of the peripherals contained in the Staff Handouts.

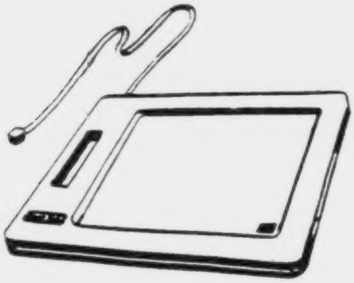
NAME:	**TOUCH WINDOW**



MANUFACTURER:	Edmark Corporation P.O. Box 3903 Bellevue, WA 98009-3903 (206) 746-3900 (800) 426-0856
DESCRIPTION:	The Touch Window is a touch sensitive pad or screen designed as an alternative to the standard keyboard. It attaches to the computer monitor with velcro strips. Users simply touch the screen to input information into the computer.
REQUIRED SOFTWARE:	Only software designed for the Touch Window will work with this device.
CONNECTION:	This board easily plugs into the back of the microcomputer via the 9 pin game I/O port.
COMPUTER:	Models are available for Apple and IBM computers.
APPLICATIONS:	The Touch Window has numerous applications for young children with handicaps as it responds to the lightest touch of a finger or stylus and provides the most direct input.
PHYSICAL ABILITY:	Only a very light touch is required to activate the Touch Window.
PRICE:	Approximately $250.00 (Apple) and $300.00 (IBM).

Source: Preschool Integration Through Technology Systems, (PITTS), United Cerebral Palsy Association of Western New York, Inc., 4635 Union Road, Buffalo, NY 14225; US DOE Grant #H024E80010.

NAME: **POWER PAD**



MANUFACTURER: Dunamis Inc.
3620 Highway 317
Suwanee, GA 30174
(800) 828-2443

DESCRIPTION: The Power Pad is a touch sensitive pad designed as an alternative to the standard keyboard. Overlays define press areas necessary to activate special software programs.

REQUIRED SOFTWARE: The Power requires special software. Each program comes with a corresponding overlay. Apple computers require software designed for the Power Pad. An IBM starter kit is required for the IBM version of the Power Pad.

CONNECTION: The Power Pad connects to the computer through the 16 pin game I/O port located inside the Apple computer. The use of an extender cable such as the Scooter Port or Power Port, permits the Power Pad to be plugged in externally. The IBM version of the Power Pad connects to the computer through a parallel interface and a Power Pad connector cable is required.

COMPUTER: Models are available for Apple, IBM, VIC, and Commodore computers.

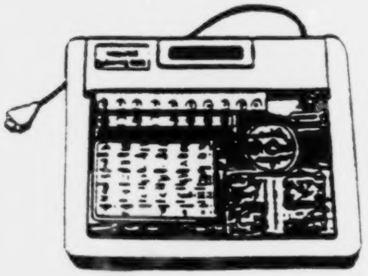
APPLICATIONS: The Power Pad utilizes a variety of overlays which, when coupled with their accompanying software, turn the Power Pad into an alternative keyboard, a communication board, a game board, a piano keyboard, a learning center, or a graphics tablet. A variety of software programs and tool kits have been developed for the Power Pad with the handicapped individual in mind.

PHYSICAL ABILITY: A moderate amount of pressure is required to activate the Power Pad.

PRICE: Approximately $200.00 for Apple and IBM version; this price includes Power Port, cable, and tool kit software.

Source: Preschool Integration Through Technology Systems, (PITTS), United Cerebral Palsy Association of Western New York, Inc., 4635 Union Road, Buffalo, NY 14225; US DOE Grant #H024E80010.

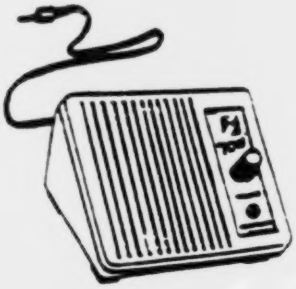
NAME: **MUPPET LEARNING KEYS**



MANUFACTURER:	Sunburst Communications 39 Washington Avenue Pleasantville, NY 10570 (800) 628-8897 (914) 769-5030
DESCRIPTION:	Muppet Learning Keys is a touch sensitive keyboard designed especially for use with children. Letters and numbers are arranged in sequence. Other keys (i.e., stop/go) are marked with pictures of popular Muppet characters or colorful graphics.
REQUIRED SOFTWARE:	The keyboard works with specially designed educational software that is available from the manufacturer. Several different software programs have been designed to be used with the keyboard. Also available is a tool kit which allows educators to design their own software for the keyboard.
CONNECTION:	The Muppet Learning Keys easily plugs into the back of the computer via the 9 pin game I/O port.
COMPUTER:	Models are available for Apple and IBM computers. An adapter is needed for Apple II, II+.
APPLICATIONS:	Although this keyboard was originally designed for non-handicapped preschoolers, it can be used by young children with handicaps with no modifications. However, some educators have developed cardboard masks to define specific keyboard areas and to block out distracting keys. Others have developed picture overlays to be used with specially designed software.
PHYSICAL ABILITY:	The keys require a moderate amount of pressure within a half inch press area to be activated.
PRICE:	Approximately $129.00 (includes "Muppets on Stage" software)

Source: Preschool Integration Through Technology Systems, (PITTS), United Cerebral Palsy Association of Western New York, Inc., 4635 Union Road, Buffalo, NY 14225; US DOE Grant #H024E80010.

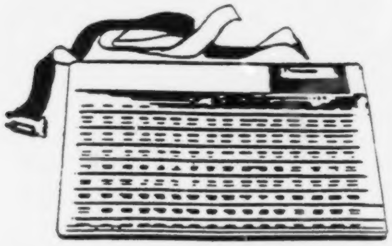
NAME:	**ECHO SPEECH SYNTHESIZER**



MANUFACTURER:	Street Electronics Corporation 6420 Via Real Carpinteria, CA 93013 (805) 684-4593
DESCRIPTION:	The Echo Speech Synthesizer is an internal printed circuit card and speaker system which brings speech output to a computer. It has two voice modes: a limited vocabulary, natural sounding female voice; or an unlimited vocabulary, robotic voice. The board can also generate sound and music.
REQUIRED SOFTWARE:	Only software that has been designed for the Echo Speech Synthesizer will actually "talk." If the card is not placed in the computer, software designed to "talk" will operate, but the user will not hear the voice or sound. The Echo IIb permits all computer sounds to emit through the attached speaker which comes complete with volume control and headphone jack.
CONNECTION:	The circuit card fits into one of the expansion slots inside the computer. No technical expertise is required for installation. The speaker plugs into the card.
COMPUTER:	Models are available for the Apple II+, IIe, IIGS; IBM PC computers.
APPLICATIONS:	Speech synthesis enhances software and has many applications for the young handicapped user which include: reading directions, giving verbal prompts, and providing feedback and motivation. Its text-to-speech program gives the Apple an unlimited vocabulary.
PHYSICAL ABILITY:	No physical ability is required to use this device.
PRICE:	$129.95

Source: Preschool Integration Through Technology Systems, (PITTS), United Cerebral Palsy Association of Western New York, Inc., 4635 Union Road, Buffalo, NY 14225; US DOE Grant #H024E80010.

NAME: **UNICORN EXPANDED KEYBOARD**



MANUFACTURER:
Unicorn Engineering Company
6201 Harwood Avenue
Oakland, CA 94617
(415) 428-1626

DESCRIPTION: The Unicorn Expanded Keyboard is an alternative to the standard keyboard. The 128 one inch square key areas can be redefined to create larger, but fewer key areas, so as to accommodate the physical capabilities of the users. When using commercial software with special software and a speech synthesizer, each key area can output a "spoken" message.

REQUIRED HARDWARE AND SOFTWARE: To operate the Unicorn Expanded Keyboard, the Apple user first needs to have an Adaptive Firmware Card installed in the computer. IBM systems require an IBM Serial Aid. Software designed for the Apple and IBM computers will operate with the Unicorn Expanded Keyboard.

CONNECTION: This board plugs into the I/O box which is part of the Adaptive Firmware Card system or PC Serial Aid.

COMPUTER: Models are available for Apple and IBM computers.

APPLICATIONS: The unicorn Expanded Keyboard allows complete keyboard access to individuals who have difficulty with the standard keyboard. Software programs can be activated by this input device which has the capability to group keys in order to enlarge the size of a press area, program active keys in a single section of the board (i.e., left side only) for individuals with limited motor use and permit speech output of user defined messages.

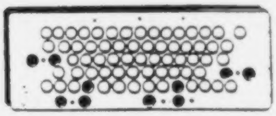
PHYSICAL ABILITY: A moderate amount of touch is required to activate the press areas. The Unicorn Expanded Keyboard has an adjustable response time. That means that the user can set the rate of activation of the keys. Keyguards and a dead-spot eliminator are also available through the vendor.

PRICE: $350.00

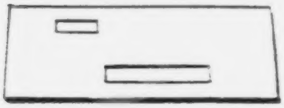
Source: Preschool Integration Through Technology Systems, (PITTS), United Cerebral Palsy Association of Western New York, Inc., 4635 Union Road, Buffalo, NY 14225; US DOE Grant #H024E80010.

KEYBOARD MODIFICATIONS

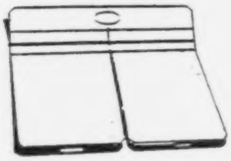
You may want to try modifying the standard keyboard to make it more successful for use by preschoolers with physical handicaps. The use of stickers to highlight important keys is one low cost suggestion. Other modifications include:



KEYGUARDS are plastic overlays with finger-sized holes that are placed over a keyboard. This prevents accidental key pressing.



Cardboard **MASKS** are placed over keyguards and are made to show only the keys that work individual software programs.



KEYBOARD COVERS are also placed over the standard keyboard and can be used with software which requires only two key selections.

Source: Preschool Integration Through Technology Systems, (PITTS), United Cerebral Palsy Association of Western New York, Inc., 4635 Union Rd., Buffalo, NY 14225; US DOE Grant #HO24E80010

LEVEL: GENERAL

GOAL: #3 Gain introduction to basic use of computer and peripherals with young children who have disabilities.

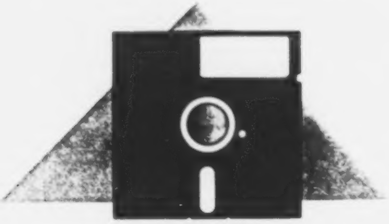
COMPETENCY TYPE: VALUE/ATTITUDE

OBJECTIVE: Participants will see the computer and peripherals as effective tools and understand that for some children, their use may provide the only means for participating in ongoing curricular activities.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
1. Individual activity Each participant will attempt to "re-type" a paragraph while his/her hand is confined within a paper bag.	1. You will need: – Computers with a word processing program loaded (Magic Slate, Bank Street Writer, Muppets on Stage, or whatever you have). – "Lunch size" paper bags.	1. In discussion, emphasize that the computer and peripherals are *compensatory* tools for children with physical or cognitive limitations. Technology is a wonderful "equalizer"!
2. Large group activity Discuss the frustration felt in attempting to utilize a standard keyboard without the necessary physical abilities. Ask participants how children with similar limitations might feel when they cannot access the computer, and to discuss specific feelings and advantages which would result upon being provided a peripheral which allows them the ability to access the computer easily.		

GOAL 4

Technology



LEVEL: GENERAL

GOAL: #4 Explore how application of computers and peripherals can be successfully integrated within a curriculum for young children with special needs.

COMPETENCY TYPE: KNOWLEDGE

OBJECTIVE: Having viewed examples via tape and demonstration, participants will list and discuss ways that computer applications can be integrated within the ongoing preschool curriculum.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
1. Large group activity Introduce the concept of integration of computer activities within the curriculum with Transparency G-T3. Show video, *Computer Learning for Young Children*. Ask participants to identify specific ways computer seemed to be integrated within the goals and activities shown.	1. Transparency (G-T3) *Goal of Integrating Computers* Video: *Computer Learning for Young Children*, High/Scope Foundation (NOTE: Check with your local SERRC for a copy of this video. You may also contact MEO/SERRC or Cuyahoga SERRC to inquire about possible loans.)	1. As ideas are offered and discussed, point out how computer is utilized to accomplish the ongoing curricular goals rather than as a "separate," "free time," or "reward" activity. Point out how off-computer activities are used to prepare students for computer activities, and reinforce computer activities. Emphasize that computer activities are tied directly to instructional goals. Point out specific examples.
2. Large group activity Giving participants a copy of *ONE* of the Preschool Curriculum Activities (from ACTT), review each step, discuss, and demonstrate the appropriate software and peripheral(s). (Be sure to choose one that utilizes items that are available!) While reviewing the activity, discuss how a specific child's learning needs can be met. Point out various adaptations that can be made for children with specific disabilities. Emphasize how this activity can fit into the program's overall curricular goals.	2. Preschool Curriculum Activities (from ACTT): Choose *ONE* of Handouts (G-H14-19) *The Wheels on the Bus Sing* *Happy, Sad - Scared, Mad* *Brown Cow, Brown Cow* *Stickybear Sounds* *Is This a Farm?* *Facemaker Memory Game* – Computer, necessary software/ peripherals. Leader Notes (G-L7) *Computer Applications for Children with Specific Disabilities*	2. *This activity will be strengthened by the degree to which you are able to "recreate" the atmosphere of an early childhood activity. Use of the suggested reinforcing materials will increase the activity's impact.* **Additional Note:** Based on the interests of the audience, you may wish to incorporate the adaptations for a specific disability into your demonstration. See section following each of the Curriculum Activities, or *Computer Applications for Children with Specific Disabilities* in the Leader Notes G-L7.

G-T3

The goal of integrating microcomputers into the curriculum is to link software and computer activities with specific instructional objectives in ways that facilitate teaching and learning.

David Edyburn, *The Process of Integrating Software into the Special Education Curriculum,* Missouri Technology Center for Special Education.

The effective incorporation of computers into the classroom is dependent on the teacher's ability to develop computer activities that match the existing curriculum.

Trieschmann, M. & Lerner, J. W. (1990) *Using the computer to teach children with special needs: A Guidebook of effective computer strategies.*

THE WHEELS ON THE BUS SING

Content Area: Music, literacy, gross motor

Child Objectives:

1. Activate the PowerPad™.
2. Identify objects on the overlay.
3. Work cooperatively with others.
4. Develop social skills.

Materials:

Poster Board and large marker
Clear contact paper or some other laminating medium
Grease pencil
PowerPad™
Echo™ Speech Synthesizer
The Wheels on the Bus (UCLA/LAUSD)
Overlay

Procedures:

Related Activity:

1. Create an open ended song board with the poster board. Laminate or have it laminated so it can be written on, then wiped off and reused.
2. During circle time, sing the song, "The Wheels on the Bus," singing well known verses and making up new ones. Before each verse is sung, erase the last verse and write the new verse in the blanks on the song board.
3. Some children don't come to school on the bus; make up verses for "The Wheels on the Car" and sing to the tune for "The Wheels on the Bus." Write the words for each verse on the song board, again wiping off the last verse and inserting words for the current verse.

Computer Activity:

Before the activity: Install the Echo™ card in slot four inside your computer and plug the speaker wire into the card. Insert the 16-pin connection of the PowerPad™ cable to either the internal game port or an external EZ-port or PowerPort and the clip end of the cable to the PowerPad™. Boot **The Wheels on the Bus.** Secure the overlay to the PowerPad™. Place the monitor so all children will be able to see.

1. Continue this activity during circle time. Ask questions — "Who rides the bus?" "Where are the people on the bus going?" "Is a school bus the same as a city bus?" "How do we ride on a bus?" "Is riding a bus different than riding in a car?" "Is a car or a bus bigger?"
2. Pass the PowerPad™ to each child. As each child activates a space, part of the song will play. Encourage children to sing along.

Helpful Hints:

Often a firm press on the PowerPad™ is needed to activate the program. Encourage those with a light touch to press hard without banging on the Pad.

Variations:

See "Paint by Bus" in this section for another activity idea.

Adaptations:

Visual Impairment: Make a smaller version of the large story board with a variety of thick cardboard forms representing the people and objects from the song. As the story is created encourage the child to feel the forms to find the appropriate one to stick on his storybook. He can the "read" along with the rest of the children by feeling the forms in his book. For the computer activity, make a tactile overlay using textures or objectives, such as hair for mommy's head and a small bottle for baby.

Auditory Impairment: Use signs for the words on the story board. Ask child to use his own familiar signs to contribute to part of the story. During the computer activity, earphones can be used with the Echo to amplify the speech.

Motor Impairment: If the child is unable to sing along with the other children, a tape could be made of a family member, such as a brother or sister, or a friend singing the song. With the tape recorder attached to a switch, the child could then take part in the group activity by pressing his switch to make his tape sing. The tape could also be the background music for the song so that the child plays the music while the others sing. For the computer activity this child may need assistance in pressing the PowerPad™. A small wooden puzzle piece with a knob could also be held by the child when pressing on the Pad to help apply extra pressure.

Source: Building ACTTive Futures, ACTT's Curriculum Guide for Young Children and Technology, Macomb Projects, College of Education, Western Illinois University, Macomb, IL 61455

HAPPY, SAD — SCARED, MAD

Content Area: Social interaction, art, health

Child Objectives:

1. Interact with others
2. Express feelings verbally
3. Recognize feelings
4. Discriminate between anger and hurt

Materials:

Reproductions of art works of facial expressions (Mona Lisa)
PowerPad™
Echo™
Feelings (UCLA/LAUSD)
Overlay
Paper and crayons

Procedures:

Related Activity:

Find pictures of famous works of art. Calendars, posters, and museum post cards are good sources for these pictures. Laminate pictures for durability. During circle time present different images of faces. Ask the children to help you decide how the person in each picture feels. "Does that person feel happy, angry, scared, sleepy ...?" "What makes people feel like that?" "What happens to you to make you feel happy?" "Do you feel different when someone hurts your feeling and when someone makes you angry?" "What do you do when you feel angry?" "When you feel happy?" "What happens to your face when you feel that way?" Offer children the opportunity to draw a face or picture of how they feel.

Computer Activity:

1. Install Echo™ card and plug the PowerPad™ cord into the 16-pin internal game port or an external PowerPort and attach the other end of the cord to the PowerPad™. Boot the software program **Feelings** to be certain it works properly. Attach the **Feelings** overlay to the PowerPad™ Select the menu option you wish to use. Place the monitor where all children can see it.
2. This activity can be used in circle time or in small groups. Pass the PowerPad™ among the children. As each child activates an area on the PowerPad™, talk about feelings that might make your face look like the face on the monitor.
3. Encourage discussion about different kinds of feelings.

Variation:

Another software program that can be used in a similar way is **If You're Happy and You Know It** (UCLA/LAUSD). It is a PowerPad™ program also.

Adaptations:

Visual Impairment: Use dolls, masks, or textured pictures which have dramatic facial expressions for the child to feel. Offer the child the opportunity to feel your face as you make the different expressions, then encourage her to feel her own face as she tries to imitate the expressions. Use a textured overlay for the PowerPad™ activity. String or sandpaper could be used to form the different expressions on the overlay.

Auditory Impairment: Use signs to express the different feelings. Headphones could be attached to the Echo™ to amplify the speech in the program.

Motor Impairment: If child has difficulty pressing an area on the PowerPad™, a small wooden puzzle piece with a knob could be held while pressing to help in applying more pressure.

Source: Building ACTTive Futures, ACTT's Curriculum Guide for Young Children and Technology, Macomb Projects, College of Education, Western Illinois University, Macomb, IL 61455.

BROWN COW, BROWN COW

Content Area: Science, language development, color recognition, cooperative play, listening skills

Child Objectives:

1. Identify different animal sounds
2. Identify distinguishing characteristics of different animals
3. Work cooperatively with others

Materials:

PowerPad™
Echo™ speech synthesizer
Old MacDonald's Farm I and **II** (UCLA/LAUSD)
Overlay
Enlarged pictures from overlay copied on card stock, each animal colored one color (brown cow, black sheep, pink pig)
Laminating film or clear contact paper
Method for binding

Procedures:

Related Activity:

1. Prepare a book using the colored animals based on the story, "Brown Bear, Brown Bear."
2. During circle time, read the book with help from the children. "What color is the cow?" "What does the cow see looking at me?"
3. Question the colors of the animals. "Are there really purple ducks?" "Have you seen a green chicken?"
4. Talk about different kinds of animals, are they all farm animals? "What makes an animal a farm animal?"

Computer Activity:

1. Insert Echo™ card and plug in the PowerPad™. Boot the software and make sure the program works correctly. Turn off the monitor and turn down the Echo™ until you are ready for the computer activity. Secure the overlay to the PowerPad™.
2. This works well as a circle activity. Children can take turns activating the PowerPad™. Encourage discussion about what the animal is, where it lives, what it eats, and the names for the young (calf, piglet, chick, lamb).

Variation:

Sing "Old MacDonald Had a Farm" or "Did You Feed My Cow"; children can make up their own verses. When using **Old MacDonald's Farm II**, talk about the prepositions which are used in the program. Use plastic farm animals and a play farm scene to encourage children to move an animal in front of or next to something. Offer the children an opportunity to pretend they are animals themselves moving in different locations, as the animals in the software. Take children to visit or invite someone to bring small animals into the classroom, one or two at a time. Children need to touch and see the real thing.

Adaptations:

Visual Impairments: Use a textured book on farm animals. Also offer the child stuffed animals or plastic animals to feel the different features of each one. Talk about one characteristic feature of each animal, such as feathers for a chicken, and use that as the basis for making a textured overlay for the PowerPad™.

Auditory Impairment: Use signs for each of the farm animals. For needed amplification of the speech in the program, attach headphones to the Echo™ speech synthesizer.

Motor Impairment: If child has difficulty pressing an area on the PowerPad™, a small wooden puzzle piece with a knob could be held while pressing to help in applying more pressure.

Source: Building ACTTive Futures. ACTT's Curriculum Guide for Young Children and Technology. Macomb Projects. College of Education, Western Illinois University, Macomb, IL 61455.

STICKYBEAR SOUNDS

Content Area: Language development, initial sound comparison

Child Objectives:

1. Sort objects by beginning sound
2. Interact in a group situation
3. Identify objects

Materials:

Stickybear ABC's (Weekly Reader)
School box
Picture of Stickybear (use a FingerPrint card or another screen dump utility to print the picture)
Vinyl letters
Small objects with the same beginning sound and letter to put in the school box
Full sheet label

Procedures:

Related Activity:

1. Print Stickybear's face and shoulders on the full sheet labels, laminate the label and attach it to the lid of the box.
2. Stick a vinyl letter to the box and then fill it with objects having that beginning sound (dog, donkey, door).
3. Pass the box around the group. Each child selects an object, identifies it, and tells something about it. ("This is a sock." "It goes on a foot." "It's white.")

Computer Activity:

1. Boot software (the child can do this).
2. As the child explores the keyboard the association between the key pressed and the image on the monitor can be made.
3. Ask questions about the pictures, encourage discussion about what is happening in the pictures. Make a short rhyme about it (Boppy balls bounce) to chant.

Variation:

Nursery rhymes or other verses with repetitive first sounds could be repeated during the circle time (Peter, Peter, Pumpkin-eater). Books or stories that repeat sounds could also be read (Bippity Boppity Boo).

Adaptations:

Visual Impairment: Attach textures to the stickers on the box so the child can identify the letter being used. Encourage the child to feel each object in the box as the beginning sound is discussed. Place textured stickers on the keyboard to help the child locate certain letters. Since there are many different sounds in this program, an association can be made between the sound and the letter. Help the child with the association by describing what is happening on the monitor.

Auditory Impairment: This activity offers a good opportunity to introduce or reinforce the sign for each letter in the alphabet.

Motor Impairment: If the child cannot use the keyboard, an alternate input device, such as a switch or Unicorn Expanded Keyboard™ and the Adaptive Firmware Card™ could be used with this program. Refer to the procedures in the section on applications for children with severe disabilities.

Source: Building ACTTive Futures, ACTT's Curriculum Guide for Young Children and Technology, Macomb Projects, College of Education, Western Illinois University, Macomb, IL 61455

IS THIS A FARM?

Content Area: Social Studies, language development, science

Child Objectives:

1. Develop identification skills
2. Express opinions verbally
3. Increase sorting skills

Materials:

Poster board
FingerPrint or another screen dump
Printer and four-color ribbon
Poster board
Laminating film or clear contact paper
Static cling vinyl
Puff paint or permanent ink markers
The Playroom (Broderbund)
Toy farm set

Procedures:

Related Activity:

1. Boot **The Playroom,** remove extra items from the farmyard and print the background. Glue the background to poster board and laminate. Use coloring books for tracing or drawing animal pictures; don't restrict the pictures to only farm animals. If you use other kinds of animals, you can make this a sorting activity. Trace or draw animals and objects onto static cling vinyl. Pay attention to relative size (cow is large, cat is small, pig is somewhere in between). Color and cut them out.
2. Discuss the kinds of animals and objects that could be found on a farm. "Are there differences between farm animals and other animals?" "What are different things you know?" Ask children to select farm animals or objects to stick to the farm scene and place them where they want.
3. Ask where the other animals and objects that are not farm related belong. "How do you know that?"

Computer Activity:

1. Boot **The Playroom** software and select the activity that contains the fairyland, mainstreet U.S.A., and a farmyard.
2. Before asking the children to participate in the activity, remove all the extra characters and objects in the scene. Continue the discussion about the kinds of animals you find on a farm.
3. As children make selections to add to the picture, question why they think that particular animal or object might belong in a farm scene.

Variation:

Katie's Farm (Lawrence Productions) is an excellent software program about farm life. It would be a nice addition to a farm unit. Also **Old MacDonald's Farm I** and **II** (UCLA/LAUSD) are PowerPad™ programs which could be used for the farm animal theme. Refer to "Brown Cow, Brown Cow" activity in this section. A field trip could be planned to visit a farm. Take pictures during the visit so that a book can be made about the children's experiences and the different animals, and activities on the farm. The book could be used as a related activity on another day. Dramatic play with the farm set provides opportunities to repeat the experience.

Adaptations:

Visual Impairment: Add textures to vinyl animals so that the child can feel to identify characteristics of different farm animals. Use a textured book on farm animals. Also offer the child stuffed animals or plastic animals to feel the different features of each one. Since the **Playroom** requires a visual orientation for controlling the cursor movement on the screen, another program, such as **Old MacDonald's Farm I** for the PowerPad™ may be more appropriate. Talk about one characteristic feature of each animal, such as feathers for a chicken, and use that as the basis for making a textured overlay for the PowerPad™.

Auditory Impairments: Use signs for each of the farm animals.

Motor Impairment: An alternate input device, such as a switch or Unicorn Expanded Keyboard™ could be set up with the Adaptive Firmware Card™ to take the place of the mouse. See the "Hidden Fish" activity in this section for procedures. Also a joystick or Touch Window®could be used with this program. (Note: Touch Window®input with Explore-a-Story programs is not the best. Objects move separate from where the child points.)

Source: Building ACTTive Futures, ACTT's Curriculum Guide for Young Children and Technology, Macomb Projects, College of Education, Western Illinois University, Macomb, IL 61455

FACEMAKER MEMORY GAME

Content Area: Visual memory, thinking skills

Child Objectives:

1. Use the icon cards to develop a pattern for the face to perform
2. Chart sequences
3. Program the face to complete the charted sequence.
4. Imitate facial gestures that illustrate feelings

Materials:

Facemaker Golden Edition (Spinnaker)
Prepared icon stickers for animation
Prepared icon cards for charting and creating patterns of sequential animation.

Procedures:

Related Activity:

1. Have several activities available near the computer center for children to construct faces. Crayons and paper plates, felt board and "face" pieces, Mr. Potato Head, clown make-up and mirrors, materials for a "Do it Yourself" bulletin board.

2. Conduct a feelings or expressions lesson. Discuss the way people's faces look when they are happy, sad, angry, tired, afraid, surprised, worried or confused. Write experience stories about some of these feelings and have children illustrate their stories.

3. Have children recall a series of events periodically during the day beginning with a two-step memory series and moving to a four-step series. "What did you do first when you came to school?" "Then what did you do?"

Computer Activity:

1. Choose a child to insert **Facemaker** disk into drive and close the drive door. Ask another child to turn on the computer and monitor. Place icon stickers over appropriate keys and review what each sticker represents. (See documentation for details).

2. Ask the children to "build" a face that can be used in the "game" section.

3. When a face is completed direct children to the "program" option and use icon cards to develop a series of patterns for the face to repeat. Chart the sequences and repeat the programmed series by pressing "return." Mix up cards and repeat animation again. Ask children to put the cards back in order again the way the face shows them to us. Start with two or three icons at a time and increase icons as children in the group master the task.

4. Encourage children to develop the ability to remember a series of actions in a specific order. Use icon cards to help children remember the order of the series of animation. Using icon cards which match the represented sticker icons children can organize their thoughts and continue to work together for longer periods of time with this program. Remove the use of icon cards as the activity is repeated increasing the opportunity for children to rely on visual memory and sequential thinking skills.

Variation:

1. Ask children to imitate the face on the computer. Have them program each other using the icon cards or verbal instructions.
2. Present a printer activity using **Mask Parade** (Springboard) to construct a mask. Encourage construction of masks that show a variety of feelings so they can be used in a discussion group and later used on a bulletin board.
3. Use ideas from the "Happy, Sad — Scared, Mad" activity.

Helpful Hints:

Some children may have trouble recognizing the differences in the facial movements. The "cry" and "wink" gestures made with the eyes and the "smile" and frown gestures made with the mouth may be difficult for some children to identify. Visual discrimination details can be pointed out for the children, for instance, "Watch for the tear when the eyes cry," and "Look at the man's eyes when he is sad; they look different than when he is happy." Children may need to troubleshoot by reorganizing their commands if a sequence is not correct. Vary the number of items in the sequence since some children may need shorter sequences than others.

Adaptations:

Visual Impairment: Use amplified speaker to increase the sound the program makes as the face becomes animated. Attach tactile clues to the keycaps of the keys which operate the program. Be sure to select a black screen as the white screen is more difficult to see.

Auditory Impairment: Use amplified speaker or headphones depending on the degree of severity of the hearing loss.

Motor Impairment: Use the Adaptive Firmware Card with simplified scanning array to allow for single switch input. Begin with three scanning items and gradually add the rest of the facial features as the child becomes more familiar with the scanning of words or symbols.

Source: Building ACTTive Futures, ACTT's Curriculum Guide for Young Children and Technology, Macomb Projects, College of Education, Western Illinois University, Macomb, IL 61455.

PART I

COMPUTER APPLICATIONS FOR CHILDREN WITH SPECIFIC DISABILITIES

In this section, we consider the needs of children with specific disability areas. The following discussion is categorized in two groups: (1) general considerations for using computers with children with various disabilities and (2) specific considerations for children with autism, visual, hearing, and physical disabilities. Each discussion includes information for children whose levels of impairment range from mild to severe. It is important that computer activities are designed to meet the individual, cognitive and physical needs of each child.

GENERAL CONSIDERATIONS FOR USING COMPUTERS IN ALL DISABILITY AREAS

The following guidelines should be taken into account when using computers with children who have special needs.

- Give clear, concise directions to children about how to control the computer.
- Post reminders to assist children who need help in locating control keys. For example, place stickers or symbols on the keyboard or adaptive device.
- When appropriate, use real objects or props in conjunction with computer activities. This can assist children in transferring skills to various environments.
- Place a speaker on top of the monitor to direct children's attention to the text or graphics. This also allows the teacher to easily control the volume of the computer sounds.
- Structure activities to enhance communication and interaction with the teacher or other children.
- Provide children with choices and control within computer activities.
- Plan lessons that will allow the children to create products, e.g., a printed story, picture, or an audio tape of a song created on the computer.
- Allow children to utilize a variety of input devices to control the computer.
- Select software that is open-ended and allows for individual levels.

CONSIDERATIONS FOR USING COMPUTERS IN SPECIFIC DISABILITY AREAS

Children with Mental Delays

Most children with mental delays respond positively to computer activities. Depending on the software, the computer can be forever patient, highly motivating, and easily controlled. The selection of software programs should be based on the children's interests and cognitive abilities. Children with severe mental impairments may use the computer only as a "cause and effect" toy to be turned on and off. Other children may use it to learn survival signs. Although most children respond positively to sound, lights, movement, and music these attributes are especially enticing for children with severe mental delays.

Children with mild to moderate mental delays should be able to use software programs that have two or more commands. These commands can be represented by pictures, letters, or stickers. Children should learn to use several input devices in order to access a variety of software programs. For example, a child may be able to easily manipulate a joystick, but have difficulty utilizing the keyboard. This may limit that child in using certain software programs. Adapting the keyboard with a keyboard overlay and colored stickers may provide the child with the cues needed to control the program. Touch pads, switches, joysticks, and keyguards have been successfully used by many of these children.

Children with Visual Impairments

It is obvious that children with visual impairments will have difficulty interacting with the computer since the output is typically visual. Adaptive devices for visually impaired individuals include braille keyboards, braille screen readers, braille printers, large screen displays, and software programs that use speech synthesizers. Children should be individually assessed to determine which software programs and adaptive devices are most appropriate. Many children with visual impairments do have some vision so that minimum feedback is possible. Some children with visual impairments have enough vision to see the text and graphics on the computer monitor if screen enlargement devices are used.

It is important that children with visual impairments feel comfortable in the computer environment. Allow time for the children to physically explore the room and the computer before activities are introduced. Let them touch all the components of the computer, including a blank disk.

Consistent use of software programs is important for all children, but especially for children with visual impairments. Familiarity with a specific computer program or adaptive device can provide an anchor and comfortable environment for these children.

Suggestions for Using Computers with Children Who Have Visual Impairments

- Use programs that include large graphics, as well as animation, sound, and music.
- Place tactile stimuli on the keyboard, keyguard, keyboard covers, and touch pads to help children distinguish between various control keys.
- Utilize the directional capabilities of the joystick to assist children in controlling the computer.
- Place a speaker on top of the monitor to assist children in locating the visual screen display.
- Program the Unicorn Board to speak the commands that the children give the computer.
- Utilize software that is compatible with a speech synthesizer or text-to-speech output or input.

Children with Hearing Impairments

Since the computer is such a visual medium, many children with hearing impairments readily attend to computer activities. In fact, some children with hearing impairments tend to become so engrossed in the computer screen that they are reluctant to communicate or cooperate with peers or teachers.

In order to avoid "losing" these children to the computer generated text and graphics, activities that encourage communication and cooperation should be selected. Using props in conjunction with computer activities can attract the child away from the screen and toward another medium, the teacher, or a classmate. For example, when using a counting software program, provide counters and containers so the child can count with the computer and also with the objects.

Some of these children are able to take advantage of software with sound through the use of volume controlled adaptive devices such as head phones or external speakers.

Suggestions for Using Computers with Children Who Have Hearing Impairments

- Use real objects or props with computer activities.
- Use an external speaker to control the volume of the software program.
- Remove other visual and auditory distractions from the area.
- Verbally repeat or manually sign the words that the computer speaks or sings.
- Develop cooperative computer activities to stimulate communication.

Children with Language Disorders

Software programs that encourage receptive and expressive language are particularly suitable for children with language disorders. Animation, music, and speech synthesis are important features of these software programs.

Speech synthesizers provide a particularly stimulating environment for children with limited language skills. Children should comprehend the speech and understand the meaning of each word that the computer speaks. The lesson plans should include activities in which computer generated words are verbally used and repeated by the children. Through the repeated use of specific software programs children gain familiarity with the language associated with those programs, and the ability of the children to use words, phrases, and sentences increases.

Children with Physical Impairments

For children with physical impairments the computer may be one of the few objects that they can manipulate independently. Adaptive devices, such as the joystick, touch window, PowerPad, Unicorn board, Adaptive Firmware Card, and switches provide children with physical impairments access to computer software. It is important that these children be positioned in the most optimal manner to access the computer. Positioning should be determined through consultation with the child's occupational or physical therapist.

A specific child may find initial success with one type of input device, but it is important not to limit that child to that single device. The ability to use a variety of input devices allows the child access to a wider variety of software programs.

The selection and use of adaptive devices, such as mouthsticks, headpointers, miniature keyboards, optical headpointers and keyboard emulators should always be prescribed by the child's occupational or physical therapist. These devices can be programmed or designed to control software programs.

Some children with physical handicaps have augmentative communication systems; devices that allow them to communicate through pictures, symbols, or synthesized speech. Many of these systems can be hooked up to the computer and used as input devices. It is always best to contact the company that developed the communication system for assistance in connecting the device to the computer.

Suggestions for Using Computers with Children Who Have Physical Impairments

- Obtain assistance from the child's physical or occupational therapist to determine optimal positioning.
- Provide the child with opportunities to utilize a variety of input devices.
- Be aware of each child's physical reactions to specific visual or auditory output from the computer. Some programs may be overstimulating for certain children.
- Utilize software that includes voice output for non-verbal children.

Children with Autism

Children with autism, or "autistic-like" behaviors, generally interact well with computer activities. In addition, interaction between children and between children and teachers can be increased through the use of microcomputers. Graphics, animation, and sound are likely to capture the interest of children with autism. Communication, interaction, and turntaking should be incorporated into as many computer sessions as possible.

The methods of computer use and software selection could have a positive or negative effect on an autistic child. Therefore, it is important to select software programs that are motivating and have the potential to be interactive. Since some children with autism tend to display perseverative behavior while using the computer, it is imperative that activities be structured so the child is required to interact with others before, during, and after the computer activity. Learning to communicate and interact with others are key goals for most children with autism.

Suggestions for Using Computers with Children with Autism

- Structure activities to enhance communication and interaction with the teacher or other children.
- Provide children with choices and control within the activities.
- Utilize software programs that include speech output.

Children with Learning Disabilities

Children with learning disabilities are able to use most software programs and various input devices, including the regular keyboard. When selecting software and creating activities, the teacher should be sensitive to the various levels of achievement, styles of learning, and areas of academic success and difficulty.

The computer can be a highly motivating tool for children with learning disabilities. Adapting the input method for various children may allow them to interact with the computer independently. If a child has difficulty with directionality and cannot use the joystick, then the arrow keys on the keyboard may be used.

Many children with learning disabilities may be above age level in certain skill areas even though they are below in others. Therefore, these children need challenging, stimulating, and interactive learning experiences. In general, the computer is a highly motivating medium for most children with learning disabilities.

Children with Behavior or Emotional Disorders

One of the characteristics of children with behavior or emotional disorders is that they can be easily frustrated. They tend to work well with the computer as long as they are allowed some control over the program. Open-ended programs with few right or wrong answers should be used when the children are first introduced to the computer.

All children need to feel competent and safe in new situations, but for children with behavior or emotional problems the impact of the initial computer contact can have a direct effect on their desire to use it. The first computer session should be planned so that children become aware of the basic structure and format of the sessions.

Another characteristic of children with behavior or emotional disorders is their desire to control people and objects in their environment. Step by step explanations should be given to these children so that they know what to expect. For example, telling the children that a new activity will begin in two minutes or when they have taken two more turns, allows them to prepare for transitions. Activities should be structured so that children have limited control during the computer session. For example, a child should be given a choice between two (rather than six) options. This would provide ample opportunity for control.

Source: Trieschmann, M. & Lerner, J. W. (1990). *Using the Computer to Teach Children with Special Needs: A guidebook of effective computer strategies.* Evanston, IL: National Lekotek Center.

LEVEL: GENERAL

GOAL: #4 Explore how application of computers and peripherals can be successfully integrated within a curriculum for young children with special needs.

COMPETENCY TYPE: SKILL

OBJECTIVE: Participants will use an early childhood software program and utilize appropriate steps to identify ways it could be used to meet a child's needs within a preschool curriculum.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
1. Large group activity Using the Transparency/Handout provided, go over the steps for *Integrating Computer Activity within the Early Childhood Curriculum:* a. Determine the child's specific goals. b. Preview and select software to meet goals. c. Select appropriate peripherals for computer input and possible speech or print output. d. Experiment with software to discover the variety of ways that it can be used. e. Define prerequisite skills for operating software and hardware. f. Plan both "pre" and "post" off-computer classroom activities to: (1) prepare for computer activity; and (2) reinforce skills gained through computer activity. g. Evaluate effectiveness of computer activity on an ongoing basis and modify as necessary. Leader may elaborate on the wide range of goals which may be developed through use of the computer. Handout G-H20, *Why Use Computer* may be passed out and discussed briefly to coincide with Step 1 in the integration process.	1. Transparency (G-T4) *Integrating Computer Activity within the Early Childhood Curriculum* Handout (G-H20) *Why Use a Computer* Leader Notes (G-L8 and 9) *Integrating Computers into the Curriculum* *Computers in Preschool Classrooms*	1. For additional information on these concepts, see the following materials in Leader Notes G-L8 and 9. *The Process of Integrating Software into the Special Education Curriculum* This article provides a highly comprehensive analysis of integration into curriculum. It is included to give the leader a solid base of knowledge for reference purposes, but is not intended for direct use within this module. See Staff section Leader Notes S-L10. In discussing the determination of goals at the beginning of the process, be sure to emphasize that the software should always be chosen based on the child's needs — not the reverse. Goals should never be developed for a child based only on available software.

LEVEL: GENERAL *(continued)*

GOAL: **#4** Explore how application of computers and peripherals can be successfully integrated within a curriculum for young children with special needs.

COMPETENCY TYPE: SKILL *(continued)*

OBJECTIVE: Participants will use an early childhood software program and utilize appropriate steps to identify ways it could be used to meet a child's needs within a preschool curriculum.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
2. Individual or small group activity Participants should work at computer stations, operating software which has been loaded. If multiple computers are not available, participants can take turns operating one computer and demonstrating programs.	2. Select two to three early childhood software programs available from your local SERRC library. Some common titles are: *Creature Chorus* *Early Learning* *McGee* *Katie's Farm* *Buddy's Body*	2. See additional software information listed previously in Leader Notes.
3. Large group activity Ask participants to cease working at their computers. Lead a discussion which generally illustrates how these selected program(s) could be used within the above process. Using the overhead as a guide, ask for specific suggestions for each step.	3. Transparency (G-T4) *Integrating Computer Activity within the Early Childhood Curriculum*	3. *Be sure to spend ample time with your selected software in order to have ideas prepared for this discussion!* Appropriate kinds of ideas may be generated from the ACTT Computer Curriculum Activities (Handouts G-H14-19) as well as *Integrating Computers into the Curriculum* and/or *Computers in Preschool Classrooms* in Leader Notes from Activity 1.

INTEGRATING COMPUTER ACTIVITY WITHIN THE EARLY CHILDHOOD CURRICULUM

1. Determine the child's specific goals.

2. Preview and select software to meet goals.

3. Select appropriate peripherals for computer input and possible speech or print output.

4. Experiment with software to discover the variety of ways it can be used.

5. Define prerequisite skills for operating software and hardware.

6. Plan both "pre" and "post" off-computer classroom activities to: (a) prepare for computer activity; and (b) reinforce skills gained through computer activity.

7. Evaluate effectiveness of computer activity on an ongoing basis and modify as necessary.

WHY USE A COMPUTER?

Once the decision has been made that a particular individual could use a computer, there is one more thing to be considered before the computer gets turned on. This is the step of goal setting. Is the student using the computer to increase understanding of the world by using cause and effect in more advanced ways? Is the student going to use the computer to learn traditional school subjects? Is the student going to use the computer as a tool for writing or some other form of communication? Is the student going to use the computer for recreational use, possibly with a peer? Or is the student going to use the computer as a practice and evaluation instrument to determine whether some other kind of high-tech device would be useful?

The educational team should work to set goals for computer use just as the team decides on language and self help goals. Below are some of the areas for which computer goals for a young student might be developed.

COMMUNICATION GOALS: Computers which talk or give children something to talk about can increase children's skills. Research indicates that use of a computer and speech output in speech therapy increases a child's language skills more than speech therapy which doesn't use a computer. (Laura Meyers, 1985)

PERCEPTUAL GOALS: Visual tracking, figure/ground, and visual memory are examples of skills which can be developed by a young child using a computer.

SOCIAL INTERACTION GOALS: If you can have fun alone with a computer, you can have even **more** fun with a friend. Young children who share computers demonstrate increased sharing and turn taking even when computers are turned off. (Clements, 1985)

FINE MOTOR GOALS: Computers are being used to help students develop skills such as joystick operation and concepts such as directionality. Young children can use keyboards, expanded keyboards, or Touch Windows as well as single switches to increase their hand use skills.

RECREATION GOALS: The computer may be a tool for having fun, too. Many young children with disabilities need outlets for independent play.

CREATIVITY GOALS: The computer may be a drawing tool for a student with immature motor skills. Or it may be an early writing tool when used with word processing.

COGNITIVE GOALS: These may be in areas as simple as learning to respond to a stimulus on cue or as difficult as learning to read, depending on the needs of the individual student. Any student who is able to attend to the computer's visual and auditory output could have cognitive goals for computer use. This is the area we most often think of when we think of computer assisted instruction.

Source: Oregon Technology Access Project, Oregon Department of Education, Division of Special Education. Funded by U.S. Dept. of Education, Office of Special Education and Rehab. Services, Grant #H180A80027.

PART II

INTEGRATING COMPUTERS INTO THE CURRICULUM

One of the major reasons that computers are not fully utilized in special education classrooms is that the computer activities are not integrated into the school curriculum. Teachers often view the computer as something apart from their regular instruction. Consequently, while children enjoy using the computer, it is used often as a reward or as a free time activity instead of an integral part of the curriculum.

Research shows that the software available to teachers often does not meet the application needs of the school, the teacher, or the child (Panyan, Hummel, & Jackson, 1988). Many teachers do not have adequate access to quality software programs, enough training on how to utilize computers and software in their classrooms, or sufficient time and resources to develop appropriate computer activities that match their students' goals and objectives.

There are thousands of quality software programs appropriate for children with disabilities that are available for a wide range of computer systems. These programs need to be molded to the specific needs of the teacher, students, and classroom. The effective incorporation of computers into the classroom is dependent on the teacher's ability to develop computer activities that match the existing curriculum.

In Part II we discuss the integration of computer activities into four curriculum areas:

- **Pre-academic Learning**
- **Language Development**
- **The Writing Process**
- **Problem Solving/Thinking Skills**

Software recommendation and sample lesson plans for each of the four curriculum areas are also provided. The four areas, pre-academic learning, language, writing, and problem solving/thinking skills, are all essential components of the special education curriculum. The use of computers in special education can enhance these areas of curriculum. The use of computers in special education can enhance these areas of instruction and provide teachers and children with new and exciting contexts for learning. Activities recommended for each curriculum area follow the INNOTEK teaching model.

PRE-ACADEMIC LEARNING

Pre-academic refers to the prerequisite skills that children need in order to learn academic subjects. Learning does not suddenly begin when a child reaches age six and enters school. During the preschool years, children engage in the learning process, mastering many skills, and acquiring the knowledge that is needed later for learning. The pre-academic areas of learning include understanding and using language, learning to attend, developing memory skills, and acquiring auditory and visual perceptual skills. Pre-academic skills also include recognizing and naming colors, letter recognition, number concepts, shape recognition, categorizing, and classifying.

Non-handicapped children often acquire pre-academic skills without special intervention before they enter school. Most children with disabilities, however, may need specific considerations to assure that they attain these essential pre-academic skills. The computer is uniquely equipped to assist young children in developing these abilities.

SAMPLE CLASSROOM ACTIVITY (COGNITIVE LEVEL 2—5)

Activity Name: Morning Song "Wash Your Face"

SKILLS

- Visual perception (picture object matching)
- Visual and tactile discrimination
- Expressive language
- Socialization

MAIN OBJECTIVES

- Provide opportunities for children to make choices
- Enhance visual discrimination and matching skills
- Encourage socialization and turntaking
- Encourage expressive language skills
- Enhance tactile discrimination skills

SOFTWARE DESCRIPTION

"Wash Your Face": Publisher, UCLA Early Intervention Program. The "Wash Your Face" program works in conjunction with the PowerPad and includes a picture overlay. The overlay separates the board into five areas that contain pictures representing five verses of the Morning Song. Each area activates the computer and allows the children to select a specific song verse. Once the children have selected a verse, an animated graphic of that verse appears and the computer sings the accompanying song.

PRE-COMPUTER PHASE

PURPOSE

The purpose of this phase is to introduce children to the "Morning Song" and to provide them with opportunities to use props/objects and imitate the actions of the song.

MATERIALS

2 Large toothbrushes

2 Washcloths

2 Combs

2 Plates, forks, and spoons

2 Paper dolls (with shirts, coats, or dresses)

ACTIVITIES

1. Teach children the "Morning Song" and include the physical actions to washing face, brushing teeth, etc.
2. Show children props and objects. Talk about what they are used for. Pass the props/objects around so the children can touch them and talk about their uses.
3. Pass out props/objects to individual children to use during the various verses of the song. When the "brushing teeth" verse is sung ask the children holding toothbrushes to imitate the action.

EVALUATION

The effectiveness of this activity will be evaluated through informal observations made by the teacher of the children's ability to sing the song, recognize objects, follow directions, and imitate actions.

COMPUTER PHASE

PURPOSE

The purpose of this phase is to introduce the children to the PowerPad and computer, to provide the children with opportunities to make choices, to reinforce object/picture matching skills, and to enhance tactile discrimination skills in an interactive environment.

MATERIALS

Software: "Wash Your Face"

"Wash Your Face" overlay

PowerPad

Echo Speech synthesizer

2 Large toothbrushes

2 Washcloths

2 Combs

2 Plates, forks, and spoons

2 Paper dolls (with shirts, coats, or dresses)

Shoe box

ACTIVITIES

1. Select children to come to the computer in groups of three for the activity.
2. Show the PowerPad and overlay. Ask the children to match the props and objects to pictures by placing them on the PowerPad to animate the screen and make the computer sing a specific verse of the song. Do this for each picture.
3. Encourage the children to sing the song with the computer.
4. Ask the children to place the props in a box.
5. Have the children take turns naming a picture, pressing it on the PowerPad, and then finding it in the box by touch alone. If a child selects the object correctly he/she gets a counter. The child with the most counters at the end of the activity is the "morning song" winner for the day.

6. Repeat these activities until all the children have had two to four turns.

NOTE: Alphabet software programs that include graphics and animation can be used for this activity also. Children could match objects to pictures on the computer screen instead of the touch pad.

EVALUATION

The effectiveness of the activities will be evaluated through a series of observations made by the teacher or the children's ability to match pictures to objects, to discriminate between objects using tactile skills, to control the computer by selecting specific pictures on the PowerPad and to take turns and cooperate with other children.

POST-COMPUTER PHASE

PURPOSE

The purpose of this phase is to reinforce object/picture matching, tactile discrimination, and social skills.

MATERIALS

Classroom objects (eraser, ball, scissors, crayon, block, clay, etc.)

Box

Picture/object lotto game

ACTIVITIES

1. Gather a group of classroom objects with various textures and shapes. Place the objects in a box. Do not let the children see the objects.
2. Give the children descriptive verbal clues for a specific object: "It is soft and squishy."
3. Choose one child from the group to find the object by feeling all the objects in the box. Children name the object/s that the child pulls out.
4. Provide children with additional activities that encourage object/picture matching (lotto, memory).

EVALUATION

The effectiveness of the activities will be evaluated through observations made by the teacher of the children's ability to use their tactile discrimination and object/picture matching skills. The teacher will also observe the children's ability to take turns and cooperate.

Source: Trieschmann, M. & Lerner, J. W. (1990). *Using the Computer to Teach Children with Special Needs: A guidebook of effective computer strategies.* Evanston, IL: National Lekotek Center.

COMPUTERS IN PRESCHOOL CLASSROOMS

OVERVIEW: This session provides curriculum strategies for using the computer in an integrated preschool classroom. The session is divided into two parts. Part one discusses and demonstrates pre- and post-lessons for computer activities. In Part two, the participants synthesize the information.

TIPS TO THE LEADER: This training session is divided into two sections. If time is limited, conclude with Part One. Part Two can be presented at a later date. Part Two can also be expanded. Teachers could develop worksheets for the most frequently used software programs in their preschool setting. Although we chose "Old MacDonald's Farm" for this activity, any other software program could be used. As this module expands concepts presented in Module 19, some of the handouts can be found in that module.

REQUIRED SKILLS: Participants are able to successfully start up a software program.

OBJECTIVES:

Part One: Pre- and post-computer activities

1. To list prerequisite skills necessary to successfully use a software program
2. To develop a pre-computer classroom activity for a preschool software program
3. To list two ways to modify a software program for preschoolers
4. To describe one way to introduce and use a software program with preschoolers
5. To list follow up activities to reinforce concepts presented in a software program

Part Two: Synthesis

6. To plan and develop appropriate activities to integrate software programs into a preschool curriculum

MATERIALS:

Hardware — for leader and each team:
    Apple IIe computer system with color monitor
    Power pad and cable
    Echo Speech Synthesizer

Software — for leader and each team:
    Variety of preschool software
    Old MacDonald's Farm (UCLA/LAUSD)

Handout Packet H-A1:
    H-19-1, Computer Activity Worksheet
    H-19-2, Completed Computer Activity Worksheet

Other Materials:
Old MacDonald's Farm overlay
Old MacDonald's Farm overlay cut up into individual pictures
Related farm animal toys
Flip chart or chalkboard
Markers or chalk

KEY POINTS/ ACTIVITIES:

Part one: Pre- and post-computer activities

1. Prerequisite software skills

1a. Explain that many times we see the computer used by teachers as an isolated tool. Often activities and software programs do not relate to the current curriculum. To use the computer as a successful tool to enhance student learning, teachers must integrate computer activities into the curriculum.

1b. Using software with students is similar to using any other curriculum material. There are at least three steps in the teaching sequence; introduction, use, and follow-up or reinforcement.

H-19-1

1c. Distribute *Handout H-19-1, Computer Activities Worksheet*. This worksheet will be used by participants to record pre and post-computer activities during this presentation. Recommend that participants also use it to make relevant notes for future reference.

1d. Start up and use a software program such as "Old MacDonald's Farm". Ask the participants to list and discuss the skills required to run the software program. Guide them to include cognitive and language skills along with pre-computer skills for successful use. Record their responses on a flip chart or chalkboard.

2. Pre-computer classroom activities

2a. Once you have reviewed the software to determine the skills necessary to operate the program successfully, group them according to skill type. Activities need to be developed for each skill to assure that the child has mastered the skill before he can successfully use the software program.

2b. Discuss the need to design a pre-computer activity for a small group session that has goals parallel to the software program. Let participants suggest activities that are appropriate for "Old MacDonald's Farm." Guide the participants through the design by providing a lesson which incorporates like skills in a different format. For example, the use of objects and related pictures pertaining to the subject matter may enhance the understanding of presented concepts. Let the participants record their responses on the worksheet under the first section 'pre-computer' activities.

2c. Demonstrate a lesson that uses the pictures on the overlay, and corresponding toy animals within a lesson on animal sounds. Explain that this related classroom activity helps to assess existing skills of children.

3. Modifying software

3a. Explain that in addition to cognitive skills, one needs to examine the method of input. Children may need assistance in identifying function keys or pictures on an overlay. If using "Old MacDonald's Farm," demonstrate the use of the pictures on the cut up overlay.

3b. In some cases it may be necessary to modify the program or the input method. If the program offers editing options, examine each as to how they pertain to the students' language, cognitive, and motor skills. For example, "Old MacDonald's Farm" can be played on three levels: by exploring the overlay where a press results in that animal appearing on the screen, or by finding the animal that the computer requests or by identifying the animal that makes a particular sound.

3c. Suggest that if you can not modify the program to change the input method, you can create your own 'editing options'.

- When using an exploratory program, a mask showing only 10 letters of the alphabet could be used to limit the field of choices or for review.
- Making a paper overlay is also an easy process.
- Questioning techniques can simplify or challenge lessons.
- The use of alternate input devices via the Adaptive Firmware Card can simplify input for all children. For example, using two switches with the Multiple Switch Box, one as spacebar and one as return, eliminates the need for the standard keyboard.

4. Using computers in classroom activities.

4a. State that when using the computer in the classroom, thought needs to be given as to how the software program will be introduced and used. Educational goals need to be established. In addition, the computer can be used to encourage social skill building.

4b. Discuss ways of using computer activities in a preschool classroom. Some may include:

- Link pre-computer activities to the software program by using the same materials as cues or rewards.
- Encourage turn taking and joint problem solving, suggest that peers must agree before a key is selected.
- Use programs with printing options or the print-it button to make a hard copy of their work to provide reinforcement for follow up activities a copy of the activity to take home.

4c. Let participants suggest ways in which "Old MacDonald's Farm" could be used in the classroom. Have them complete the second section, "Computer Activities," on their worksheet.

5. Follow up activities: Suggestions

5a. Follow up activities can reinforce concepts presented during computer use. Let participants suggest follow up activities for "Old MacDonald's Farm."

H-19-2

5b. Distribute *Handout H-19-2, Completed Computer Activities Worksheet* to each participant. Discuss similarities of the activities on the handout and those just completed by the previous activity. Explain that this is a completed worksheet based on another piece of preschool software. Give them a few minutes to review the contents.

Part Two: Synthesis

6. Designing pre- and post-computer activities

6a. Instruct the participants to select a software program, review it, and use the form to record suggested activities.

6b. Allow time (15 minutes) for the participants to plan and develop appropriate activities that will integrate software programs into the curriculum. Make sure they include:

- assessing prerequisite skills
- developing pre-computer activities
- modifying the software program
- developing ways to introduce and use the software program
- developing follow up activities to reinforce concepts

6c. Reconvene the group. Sharing the results with the other teams would be beneficial for all.

CONCLUSION: This activity discusses perhaps one of the most difficult tasks for any teacher, the integration of software programs into the curriculum. Software programs are just like other curriculum material. Thoughtful planning for their success in the classroom must be addressed. Computer activities are best provided within the context of other classroom activities. Conclude by drawing participants attention to the worksheet. Emphasize the need for the development of pre- and post-computer activities. Field any questions.

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Osterman, G. B., Greig, C. & Kihan, L. (1987). *Sunburst Curriculum Planner.* Pleasantville, NY: Sunburst Communications.

Source: Preschool Integration Through Technology Systems. (PITTS). United Cerebral Palsy Association of Western New York, Inc., 4635 Union Rd., Buffalo, NY 14225; US DOE Grant #H024E80010.

LEVEL: GENERAL

GOAL: **#4** Explore how application of computers and peripherals can be successfully integrated within a curriculum for young children with special needs.

COMPETENCY TYPE: VALUE/ATTITUDE

OBJECTIVE: Participants will appreciate the positive benefits experienced by young children with special needs when computer applications are fully integrated within the early childhood curriculum.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
1. Large group activity Review Handout and ask participants to name the positive benefits young children derive from the computer use. Be sure the following are pointed out: – Children intrinsically seem to have FUN and ENJOY using computers. – They can participate in the same activities as their peers. – Increased language stimulations and opportunities for social interaction. – Gives children unique opportunities for independent control and accomplishment (especially apparent for those with physical limitations). – Computer has lots of patience, never tires of the same activity, is always ready to play, and never yells when a mistake is made! Secondly, ask participants to identify specific advantages for young children with special needs when computer activities (or any technological applications) are integrated within the ongoing curricular goals.	1. Handout (G-H21) *What Computers Can Do*	1. Throughout this objective, leader should emphasize how much young children *enjoy* using the computer, how it *motivates* them to complete tasks, and how children are *rewarded* by the visual/auditory feedback and the intrinsic sense of *autonomy and control* it provides. Point out that *integration of computer activities within the ongoing curriculum provides children with disabilities maximal opportunities for their own full integration within activities with their nondisabled peers.* To the degree that technology is present within their total curricular experience, children with disabilities are provided an avenue through which they can participate to highly significant degrees with their peers and profit from the ongoing curricular program. When technology is treated as an "extra" or utilized only at particular times, children with disabilities are denied the opportunity to participate with their peers and profit from the ongoing curricular program to the greatest extent possible.

"If we focus on what they can do and work with that, then the child can find ways to work around the handicap."

Laura Meyers

WHAT COMPUTERS CAN DO

1. Give children control and independence
2. Give young children a voice
3. Provide an avenue for socialization, sharing, and teamwork
4. Help children develop cognitive skills
5. Provide immediate feedback
6. Remove emotional overlay from difficult tasks
7. Provide a tool for creativity in children with limited cognitive and motor functions.

Source: Oregon Technology Access Project, Oregon Department of Education, Division of Special Education. Funded by U.S. Dept. of Education, Office of Special Education and Rehab. Services, Grant #H180A80027.

GOAL 5

Technology

LEVEL: GENERAL

GOAL: #5 Gain an overview of augmentative/alternative communication (AAC) system as a means of meeting the needs of young children with severe communication difficulties.

COMPETENCY TYPE: KNOWLEDGE

OBJECTIVE: Participants will learn and discuss specific ways AAC systems assist young children in meeting their communication needs.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
1. Large group activity Show videotape, *Let's Talk.*	1. Check with your local SERRC for a copy of *Let's Talk*. Copies are also available from ORCLISH. Transparency (G-T5) *Definition of AAC*	1. Prior to showing the video, you may want to provide a definition of AAC. Augmentative and alternative communication refers to any approach designed to support, enhance, or augment the communication of individuals who are not independent communicators in all situations. (Beukelamn, Yoder, & Dowden, 1985.) Ask participants to describe how AAC systems were shown in the video to assist children in communicating.
2. Large group activity As appropriate to needs of audience, review key concepts and terminology from the Handout.	2. Handout (G-H22) *Augmentative and Alternative Communication,* Tech Use Guide Series, CEC, July 1990. Leader Notes (G-L10) *Augmentative Communication Devices*	2. Be sure to stress the broad range of systems available - low to high tech, making references to those in video. Emphasize the need for a thorough assessment of individual needs for matching needs to appropriate systems. The importance of an interdisciplinary team approach in all phases of assessment, vocabulary selection, and training for use in various environments should also be highlighted. (**NOTE:** Further elaboration of these concepts is made available for the leader in Leader Notes G-L10. The leader may wish to use some pages of these notes as Handouts.

ONE DEFINITION OF AAC

Augmentative and alternative communication refers to any approach designed to support, enhance, or augment the communication of individuals who are not independent communicators in all situations.

(Beukelamn, Yoder, & Dowden, 1985)

TECH USE GUIDE

USING COMPUTER TECHNOLOGY

Center for Special Education Technology

Augmentative and Alternative Communication

Augmentative and alternative communication (AAC) refers to any approach designed to support, enhance, or augment the communication of individuals who are not independent communicators in all situations (Beukelman, Yoder, & Dowden, 1985). Communication augmentation is appropriate for those who experience difficulty with the spoken and/or written forms of expressive communication. It is important to note that an individual's communication system should not be a single device or technique, but rather a collection of techniques, devices, and strategies that can be employed as the communicative situation warrants. Components of this collection include gestures, facial expression, writing, residual speech, signal systems, nonelectronic communication systems of various sizes and complexity, and electronic AAC technology.

Benefiting from AAC Approaches

AAC approaches benefit individuals with severe difficulties in speaking and/or writing. For those whose oral-motor dysfunction is so severe that speech is not intelligible, AAC approaches provide an alternate method of expression. Individuals with limited arm and hand movements can take advantage of alternate access to print capabilities. AAC approaches with spoken output can assist individuals with low vision, and AAC systems with visual display and print capabilities can assist individuals with hearing impairments. AAC approaches may also be beneficial for individuals with cognitive impairments, not only as a means of expressive communication but also as a language learning tool.

"Low Tech" Approaches

There are many AAC approaches that do not involve sophisticated technology. These approaches may be implemented in isolation, but they more often serve as components in a comprehensive AAC intervention.

Signal Systems. These systems permit an individual to call for help, attract attention, and answer simple yes/no questions. Such systems usually consist of a switch and a signal of some type. The switch is placed in proximity to a body part that the user can move easily and reliably. The signal could be a buzzer or chime, or it could be a tape-loop saying "Come here" or "I need help." Some individuals may be able to use the signal for simple coded messages (for example, one buzz means yes, two buzzes means no, three buzzes means I don't know) or for Morse code.

Communication Boards. This term refers to any display containing vocabulary choices from which the user selects a message. Low tech communication boards are those without electronic components. They can be made using a variety of materials, including wood, plexiglass, posterboard, notebooks, and paper. Communication board displays may contain objects, letters and numbers, words, phrases, photographs, or graphic representations. Brandenburg and Vanderheiden (1988) summarized the many factors that must be considered in the design of a communication board. These include:

- The physical technique the individual will use to select message components from the display.
- The types of symbols to be used on the display.
- The vocabulary items to be included.
- The arrangement of vocabulary on the display.
- The interaction strategies that the augmented communicator will use.
- The attitudes and communication styles of the augmented communicator and potential communication partners.

An individual might have a single board that contains letters and numbers and enough words and frequently occurring phrases to meet most of his communication needs. A student might use different mini-boards for different academic subjects or for different settings (playground, mall, Sunday school). Communication boards also serve as a back-up system should the user's electronic system fail.

"High Tech" Approaches

The incorporation of microprocessor technology into AAC systems has made a number of valuable features possible.

Large Vocabulary. Many AAC systems offer vocabulary capacities in excess of 2,000 entries. The challenge for the user is the management of such large vocabularies, because most systems have static displays containing a finite (and relatively small) number of items. Systems such as *Say-it-All II Plus*, *scanWRITER*, and *VOIS 160* store vocabulary at a number of levels, requiring the user to activate the appropriate level as well as the correct location on the display in order to make a message selection. Users often consult a glossary that lists available vocabulary along with the activations that are required to access each item.

Several approaches have been designed to minimize the memory demands on the user. All of the devices mentioned thus far can accommodate multiple overlays, one corresponding to each memory level. A new device, *The Talking Screen*, offers a dynamic display — the display itself changes, permitting each level to be displayed without any manual changing of overlays. *The Touchtalker with Minspeak* uses multimeaning icons to facilitate access to vocabulary items not visible on the display. The user codes his vocabulary selections with meaningful sequences of pictures, and thus doesn't need to remember a large number of letter or number codes.

Output Displays. Many devices contain LED or LCD areas for display of messages. As the user makes a selection, the words appear in the display. This permits the user to review the message, and serves as a medium for the communication exchange between partners. Many systems also generate hard copy (print on paper), a useful feature when a permanent record of communication is desired.

Speech Output. One of the most significant advances in AAC has been the availability of spoken output. Speech output renders technology accessible to those who cannot read and those with visual impairments. It also makes communication possible in the traditional auditory modality. Some devices, like the *Mini Talking Card Reader*, record short segments of a speaker's voice onto magnetic tape. Devices like the *Wolf* and *Touchtalker* produce synthesized speech, which is created by subjecting text to a set of pronunciation rules.

The appeal of synthesized speech is its flexibility. Any utterance that can be entered as a text string can be produced, resulting in the potential for unlimited vocabulary. The sophistication of speech synthesizers varies, as does the quality of the speech they produce. Generally, research has demonstrated that *Echo*, *Votrax*, and *Smoothtalker* speech are significantly less intelligible than *DECtalk* speech (Mirenda & Beukelman, 1987).

An alternative to synthesized speech is digitized speech. In this approach, the speech is digitally recorded, modified for storage in the system, and then reconstructed as spoken output. Although this process yields much more natural-sounding speech, it is very memory-intensive. It is also less flexible than synthesized speech because only prerecorded output can be used. Among the AAC systems offering digitized speech capabilities are the *Introtalker*, *ALLTALK*, and *Parrot*.

Input Modes. Advances in input technology facilitate access to AAC systems for individuals with the most severe motoric limitations: almost any physical movement now can be harnessed to control communication systems. For example, the *P-Switch* can be activated by almost any muscle movement and can be used to control scanning communications systems. *Voicescribe-1000*, a voice input system with a potential 1,000-word vocabulary, can be used by individuals with consistent vocal output who need to access written communication options. *Freewheel* is a cordless device that allows head-pointing and other body motions to be used to access standard software on a personal computer.

Rate Enhancement Techniques. Several AAC systems incorporate features that improve the efficiency of communication for the user. Prediction routines, such as those found in the *Portable Anticipatory Communication Aid* (PACA) and *Equalizer*, learn the word usage frequencies of the user. When the user begins entering a word, the system responds with the most frequently used words beginning with that letter sequence. Abbreviation routines, as found in the *RealVoice*, allow the user to access items in memory using abbreviation. For instance, the system might be programmed to produce "See you later" with the single keystrokes "C-U."

Customizability. Each individual has unique communication needs, and it is important to be able to customize a system to meet those needs. Many systems come with a standard vocabulary, but allow the user or caregiver to program in additional vocabulary as needed. Similarly, most systems offer the consumer the option of customizing overlays to make them appropriate to the user's cognitive and linguistic abilities.

Assessment and Intervention

Every user presents a unique constellation of needs and abilities, and the range of available AAC systems expands yearly. The process of matching user needs to appropriate interventions should involve thorough evaluation and careful consideration of options.

Potential consumers of AAC interventions may demonstrate deficiencies in motor abilities, cognitive abilities, language skills, social/emotional development, and performance of activities of daily living. All of these areas should be evaluated, because AAC intervention will be affected by them and will in turn exert some influence on them. The need for such a comprehensive approach requires that input be derived from a multitude of sources. A team approach is essential, with expertise being shared among parents, potential AAC consumers, teachers, aides, speech/language pathologist, occupational therapists, physical therapists, medical personnel, ophthamologists, audiologists, educational diagnosticians, psychologists, social workers, rehabilitation engineers, and others with pertinent input. Several protocols have been developed to guide the assessment process (see Beukelman, Yorkston, & Dowden, 1985 and Blackstone, Cassatt-James, & Bruskin, 1988).

It should be emphasized that AAC assessment and intervention are not discrete events, but rather components of the process of assisting an individual to reach his or her highest potential. Contrary to popular belief, the process is not completed when a consumer acquires an AAC system. Understanding of AAC has matured in the past decade, and most people now realize that successful communication abilities do not emerge automatically as a function of device acquisition. Communication skills must be taught, with the goal being the achievement of **communicative competence**. Light (1989) defines a competent communicator as one whose communication is functional, adequate, and skilled in regard to the linguistic, operational, social, and strategic aspects of communication. A competent communicator is one whose communication can meet the demands of daily life. The communication does not have to be perfect, because no one is a perfect communicator. Rather, the user should demonstrate an adequate grasp of vocabulary and grammar, adequate operation of the AAC systems, appropriate interaction skills, and the ability to employ compensatory strategies to enhance communicative effectiveness.

Attention should be directed toward all of these abilities during training. Furthermore, training should be provided not only for the augmented communicator, but for the communication partners as well. Caregiver training could almost be considered a prerequisite for success. Without interested, encouraging, skillful partners, many of the augmented communicator's opportunities for learning and practice would be lost. Given the importance of early success to later motivation and effort, it is essential that training be directed at both sides of the communication dyad.

Crucial Intervention Issues

Training Interaction Strategies. So often people with severe expressive communication problems learn to assume a passive role in communication interactions. They get lots of practice responding, but little experience initiating. Thus, AAC intervention must include explicit instruction in interaction behaviors and strategies. AAC consumers must learn that there is no single correct way to interact with all communication partners: The interaction strategies employed should be selected on the basis of the communication task, the setting, and the skills and attitudes of the partner. Consumers must learn how to get attention, introduce topics, negotiate meaning, interrupt, convey emotion, take turns, and resolve communication breakdowns. They need to learn to work with their communication partners to maximize the successful transfer of information. Kraat (1987) provides an excellent overview of this topic.

Promoting Language and Literacy Skills. The lack of language and literacy skills limits an individual's AAC options. Systems based on spelling, or those requiring knowledge of morphological and syntactic conventions, are inaccessible to individuals without sufficient language and literacy skills. Difficulties with these skills often hold students back from academic achievement and prevent adults from performing adequately at the job site. This topic has just recently begun to be addressed in the literature. Blau (1988) suggested a four-phase approach to developing literacy in young children that emphasizes a positive reading experience, development of a sight work vocabulary, an introduction to phonics, and the development of sentence comprehension. Very young children who have had access to a symbol-based communication system may have an inherent understanding of symbolic representation, lessening the difficulty of the transition to the written word.

Children who are nonspeaking do not have the opportunity to practice sound/letter correspondence orally, so interventionists must emphasize these relationships in other ways. Access to an AAC system may provide an individual with his first opportunities to experiment with sound combinations (if the system has voice output) and language manipulation. Cohen (1988) suggests ways in which word processing software developed for the regular education market can facilitate the development of literacy skills.

Vocabulary Selection. An AAC consumer's communicative effectiveness and efficiency can be enhanced if the system provides access to the appropriate vocabulary. There are many techniques that one can use in making vocabulary determinations. In all cases, it is crucial to approach this task in terms of what the consumer wants and needs. Yorkston and her colleagues (1989) described several methods to employ when selecting vocabulary:

Environmental inventories — This approach to vocabulary selection involves a survey of each of the environments in which the AAC consumer interacts to determine the people and objects present and the activities that are likely to occur. From these observations, lists of potential vocabulary items can be generated.

Communication diaries — AAC system vocabulary should be updated frequently to reflect changes in the user's lifestyle and communicative interactions. To facilitate this updating, the consumer can compile a history of communications either by printing and saving all output (if the system has this capability) or by having someone record the communications for a period of time. Analysis of this record will reveal those items used frequently that are not available in the vocabulary.

Vocabulary list review — Another excellent technique is the review of vocabulary lists. It is difficult to generate vocabulary items spontaneously, but much easier to recognize appropriate words on a list. A review of standard lists is also helpful in identifying the structural words essential for grammatically correct utterances. Often these words are overlooked because the focus is on listing words that will expand the content of a user's communication.

Blau (1986) offers some guidelines for evaluating the utility of selected vocabulary. Among her criteria are:

- Can the item be used to code a variety of communicative functions?
- What is the potential for recombination of the item?
- How frequently is the item used, and in what settings?
- How much information is conveyed by the item?
- How high in reinforcement value is the item for the consumer?
- Does the item have potential for peer interaction and play?
- How much interest does the item hold for the consumer?

In determination of vocabulary, as in all aspects of assessment and intervention, the consumer should be involved in the process to the greatest extent possible.

Resources — Organizations

American Speech-Language-Hearing Association. 10801 Rockville Pike, Rockville, MD 20852, 301/897-5700.

Applied Science and Engineering Laboratories. University of Delaware/A. I. duPont Institute, 1600 Rockland Road, Wilmington, DE 19899, 302/651-6830.

RESNA. 1101 Connecticut Avenue NW, Suite 700, Washington, DC 20036, 202/857-1199.

Trace Research and Development Center. S-151 Waisman Center, University of Wisconsin-Madison, 1500 Highland Avenue, Madison, WI 53705, 608/262-6966.

United States Society for Augmentative and Alternative Communication. Judy Montgomery, President, Fountain Valley School District, 17210 Oak Street, Fountain Valley, CA 92708, 714/857-1478.

Resources — Journals/Newsletters

Augmentative and Alternative Communication (journal). Williams & Wilkins, Publisher, 428 E. Preston Street, Baltimore, MD 21202-3933.

Augmentative Communication News (newsletter). Sunset Enterprises, One Surf Way, Suite 215, Monterey, CA 93940, 408/649-3050.

Communication Outlook (newsletter). Artificial Language Laboratory, Michigan State University, 405 Computer Center, East Lansing, MI 48824-1042, 517/353-0870.

Closing the Gap (newspaper). Rt. 2, Box 68, Henderson, MN 56044, 612/248-3294.

Availability Information

Trace Resourcebook: Assistive Technologies for Communication, Control, & Computer Access. Available from the Trace Center, address above.

Wallchart on Commercially-Available Communication Aids. Available from Applied Science and Engineering Laboratories, address above.

Assistive Technology Sourcebook. Available from RESNA, address above.

ABLEDATA (product database). Available from Adaptive Equipment Center, Newington Children's Hospital, 181 East Cedar Street, Newington, CT 06222, 800/344-5405.

Products Mentioned in Text

ALLTALK, FreeWheel, RealVoice. Adaptive Communication Systems, Inc., 354 Hookstown Grade Road, Clinton, PA 15026, 412/264-2288.

Mini Talking Card Reader. Crestwood Company, P.O. Box 04606, Milwaukee, WI 53205, 414/461-9876.

Voicescribe-1000. Dragon Systems, Inc., 55 Chapel Street, Newton, MA 02158, 617/965-5200.

Say-It-All II Plus. Innocomp, 33195 Wagon Wheel, Solon, OH 4439, 216/248-6206.

VOIS 160. Phonic Ear Inc., 250 Camino Alto, Mill Valley, CA 94941, 415/383-4000.

Introtalker, Touchtalker, P-Switch. Prentke Romich Company, 1022 Heyl Road, Wooster, OH 44691, 216/262-1984.

Equalizer, Talking Screen. Words +, Inc., P.O. Box 1229, Lancaster, CA 93535, 805/949-8331.

Parrot, scanWRITER, PACA. Zygo Industries, Inc., P.O. Box 1008, Portland, OR 97207, 503/684-6006.

Readings

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Beukelman, D. R. Yorkston, K. M., & Dowden, P. A. (1985). *Communication augmentation: A casebook of clinical management.* San Diego: College-Hill Press.

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Mirenda, P. & Beukelman, D. R. (1987). A comparison of speech synthesis intelligibility with listeners from three age groups. *Augmentative and Alternative Communication*, 3, 120-128.

Mirenda, P. & Mathy-Laikko, P. (1989). Augmentative and alternative communication applications for persons with severe congenital communication disorders: An introduction. *Augmentative and Alternative Communication*, 5, 3-13.

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- Visual Impairments
- Learning Disabled
- Telecommunication Networks
- Augmentative and Alternative Communication
- Mildly Handicapped

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WHAT IS AUGMENTATIVE AND ALTERNATIVE COMMUNICATION?

The term "augmentative and alternative communication" sounds like a mouthful of words. Professionals in work settings that serve individuals with developmental, physical, or medical disabilities instead often use the term "AAC" to refer to this relatively new way of helping people with certain communication disabilities. AAC involves the use of communication techniques to supplement or to augment one's physical ability to use oral or written communication.

A simple communication board consists of some pictures glued to a piece of poster board; the board is covered by clear contact paper. Several miniboards contain specific vocabulary for a variety of situations. The communication board does not "speak"; someone else is needed to read aloud the message the student wants to send. Some communication devices are electronic and may speak the words or phrase, print out the message on tape or have it appear on an LED (Light Emitting Diode) display.

Other AAC users, because of more extensive physical disabilities, may need to indicate a word choice by activating a switch which is connected to an electronic communication device. Regardless of the degree of disability, most people are capable of operating a switch by either using direct pressure on the switch or by using a minimal motion such as a facial movement to activate it. For example, if a person can spell, only eye movement may be needed to type out messages on a communication aid.

Some people are AAC users but they do not use a physical aid for communication purposes. Instead, they may use their hands for communicating by manual sign language or some other gesture system. Others, particularly those with severe cognitive impairment, may use body movements, such as reaching or pushing something away, as a means of communicating some messages.

Many AAC users will use a variety of ways to communicate. What works best is a highly individualized matter for each person. Some people can't read and need to use pictures; others lack the hand skills to use any sign language. An electronic device may be appropriate for some individuals while others are more effective with a nonelectronic device. AAC options are numerous because the abilities and needs of the various users are very diverse.

An excerpt from *Augmentative/Alternative Communication in Indiana* by Beverly Vicker and Diane Williams, Indiana University, Bloomington, IN.

WHO CAN BENEFIT FROM AUGMENTATIVE ALTERNATIVE COMMUNICATION?

Augmentative aids and techniques are appropriate for individuals with varying degrees of physical or cognitive involvement that interfere with effective vocal communication. They are appropriate for individuals of all ages. Augmentative aids can also be used with individuals who can speak, but are unable to write because of sensory or motor impairment. Populations that may benefit include persons with:

A. **Neurological Diseases:**
   Amyotrophic Lateral Sclerosis (Lou Gehrig's Disease); Multiple Sclerosis; Muscular Dystrophy; Parkinson's Disease; Huntington's Chorea

B. **Acquired Conditions:**
   Head injuries from car, motorcycle, snowmobile accidents; strokes; spinal cord injuries; laryngectomy; glossectomy

C. **Congenital Conditions:**
   Cerebral palsy; mental retardation; developmental speech/language disorders; genetic syndromes

D. **Temporary Conditions:**
   Guillain-Barre syndrome; Reye's syndrome; post-surgery/trauma (intubation, tracheotomy, respirator)

WHY USE AUGMENTATIVE ALTERNATIVE COMMUNICATION?

Everybody has something to say. Communication is a basic right and necessity. Personal and academic achievement is closely related to the ability to communicate.

An excerpt from *Augmentative/Alternative Communication in Indiana* by Beverly Vicker and Diane Williams, Indiana University, Bloomington, IN.

GENERAL INFORMATION AND RESOURCES FOR OBTAINING AUGMENTATIVE COMMUNICATION AIDS

Before seeking funding for a communication device, many preliminary activities take place. A complete, multidisciplinary assessment is recommended by professionals who have been trained in the area of augmentative communication and technology. This team could include but would not be limited to a speech/language pathologist, occupational therapist, educator, psychologist, nurse, vocational counselor, etc. Parents or caregivers should also be included in this team to supply information and evaluate various systems. "Low Tech" or non-electronic options should be considered as well as electronic devices. The intent to communicate must be clearly identified through the assessment process. Seating and positioning must be addressed to insure that the individual is using the most efficient system of accessing the device or system.

Use of several communication systems and/or devices on a trial basis in all settings is highly recommended after the assessment. An inventory of initial vocabulary and phrases from the assessment and observations of the individual in various settings can be individually arranged or programmed on the system/device for the trial period by the speech/language pathologist or other trained professional with team input and involvement.

The team should reconvene to evaluate the effectiveness and appropriateness of each system/device and the access mode. The team should make sure that all appropriate systems/devices are considered or tried by the individual before making a final recommendation. Consideration should be made in regards to future needs and uses. A less costly device may not always allow for flexibility and growth. Since individuals and technology change frequently, upgrading systems will need to be considered periodically depending upon needs.

Assistance with resources to evaluate and assess nonspeaking/nonwriting individuals can be obtained by contacting the educational agency where a child, birth through 22, resides or public centers for medical or vocational rehabilitation, speech/language pathology, etc. The references listed on the following pages of this booklet may be consulted.

Steps to Funding. (May 1991). Ohio Augmentative Communication Problem Solving Consortium.

AUGMENTATIVE COMMUNICATION DEVICES

Carol Suddath and Jackie Susnik

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U.S. Department of Education

INTRODUCTION

Communication is the sharing of one's needs, feelings, experiences, and ideas through different channels or modes. These modes of communication may be verbal (spoken, through verbal speech or speech output communication aids) or nonverbal (facial expressions, body language and orientation, gestures, and tones). Approximately 35% of what we communicate is verbal and 65% nonverbal. For example, "Honey, come here" may take on different shades of meaning, depending on the accompanying tone, body language, and facial expression of the speaker. Communication may also take a variety of forms, including spoken, written, and artistic (music and art forms).

To interact with others, we must have some understanding of what communication is and what the verbal and nonverbal messages of others mean. Our receptive language involves our ability to "make sense" of the words used by others, so that there is a common frame of reference. For example, when the word "chair" is spoken, both listener and speaker envision a similar picture or referent. Thus, an individual must have sufficient receptive language to be able to produce a message that will be understood. In cases where the overall receptive language is depressed, you should expect that use of communication technologies will be directly related to language competence. In other instances, there may be specific receptive gaps or an inability to transform receptive language into expressive communication, which will restrict or limit the ability to produce all expressive components.

Augmentative/alternative communication (AAC) can help people with both productive and receptive communication disabilities to interact with the world. AAC refers to any technique used to enhance or augment communication. For many years, people have designed and used AAC systems and strategies to communicate with nonspeaking individuals. Some of the methods used have included multiple choice questions, eye blinks, gestures, sign language, communication boards, communication books, alphabet boards, and even primitive Morse Code systems. Recent years have seen the addition of computers and environmental control systems. Most of these systems are still effective and are a part of AAC technology today. One of the most liberating pieces of technology is the voice output communication aid (VOCA).

VOCAs are stand-alone, dedicated electronic devices that produce computer-generated speech. Many VOCAs are available, each with its own distinct features and characteristics to serve the diverse needs of students with communication disabilities. Please bear in mind that, as important as the VOCA may be, it is still only part of the student's communication system. The "big picture" requires that we promote the use of all appropriate communication strategies, both verbal and nonverbal.

We've written this booklet to introduce you to VOCAs. Whether you are a primary user, parent, teacher, or speech therapist, it is designed to give you a "nuts and bolts" description of how, when, and what to expect when using a VOCA in the classroom.

Two things are critical for you to remember as you begin this new endeavor: (1) You already possess a wealth of information and skills in your field; and (2) To effectively implement technology, remember that it is a means to an end, not the end itself. More than once, it has surprised us to find out that competent service providers lose sight of this.

A brief illustration may clarify what we are trying to say. A speech/language therapist was being trained on the programming of a Speech Pac voice output communication aid. During the process, she asked, "Now that the system is operational, what should I work on with this student?" Our reply was simply to ask where she placed his language skills and what would she work on with any student who was at that level. She realized that she had the training to deal effectively with this student, and that she, herself, was quite capable of developing appropriate objectives.

This story is not meant to disregard strategies that are unique to effectively using an augmentative communication system. It is, however, meant to reassure our readers that they have the prerequisites to assist students in developing their communicative potential.

VOCA-related terminology, general training techniques, common problems, and helpful hints are described to help you settle into this unfamiliar territory comfortably. Part 1 of this booklet discusses the essential "people" factors in VOCA use — the educational team and the student. Part 2 provides guidelines for accommodating VOCA users in the classroom and using the device for enhancing their learning. Part 3 explores how students can benefit from VOCA as they go out into the community. Part 4 provides precautions, helpful hints, and a troubleshooting checklist. The appendixes include a glossary, devices and vendors list, resources, and references.

We hope that this booklet will get you started and inspire you to delve further into the opportunities afforded by VOCA technology.

PART 1

THE EDUCATIONAL TEAM AND THE STUDENT

What is the Educational Team?

When a nonspeaking person enters an educational or hospital setting, he or she is evaluated to determine what AAC systems or training options might be appropriate. Individuals involved in this evaluation process might include a speech pathologist, physical therapist or occupational therapist (support staff), medical doctor or nurse, psychologist, engineer, computer technology specialist, teacher, social worker, vocational counselor, parent/direct care giver, and the student. It is important that parents and direct care staff be involved throughout this evaluation process, as well as in the training that follows. This evaluation differs across states and facilities, but the outcome includes recommendations that match the student to the training process and AAC system that best meets his or her individual personality and needs.

If possible, the student should have the opportunity to use the recommended system(s) on a trial basis, before a specific VOCA is purchased. The evaluation process, along with its documentation, is extremely important because there is no single device that is appropriate for all nonspeaking individuals. Attempts should be made to obtain a copy of this evaluation and therapy progress reports, to provide a complete picture of the student's needs and functioning level. Direct contact with members of the evaluation team, educational team, or previous support staff is also recommended. This is particularly important if you experience frustration with use of the VOCA. Although the educational team attempts to make an ideal match between user and device, for a variety of reasons, optimal decisions do not always result. Communication among evaluation team, practitioners, and users facilitates ongoing evaluation and feedback. Thus, if vocabulary revisions are required or if a different device would be deemed more suitable, a decision encompassing all three perspectives can be made.

What Do You Need to Know About the Student?

It has been said that you cannot select a VOCA for anyone until you know that person as an individual — his or her capabilities, limitations, needs, interests, hopes, and aspirations. This axiom makes sense because a VOCA is indeed an extension of the individual's personality.

You need to evaluate the student's abilities, including motor, perceptual, cognitive, social, and communication competence. You need to consider the student's physical and social environments because they are an intrinsic part of communication effectiveness. Educational and vocational goals also need to be addressed in VOCA selection.

As every experienced teacher knows, three issues are crucial to success in acquiring and using a new skill.

- The student must have appropriate opportunities to use the skill. You have to look at the student's daily schedule and determine when and where such opportunities are likely to occur. For example, if you want to encourage dialogue, you need to be aware of relaxed, uninterrupted time segments when conversation might naturally take place.
- You need to know what motivates the student. In some cases it may simply be pleasing the teacher; or it may be that the child wants to be the center of attention; or it may be a tangible reward. In the optimal scenario, the simple act of communicating will be reward enough.

- Take advantage of the student's sense of humor. It's a prime motivator for spontaneous communication and social interaction.

Obviously, you will want to evaluate these areas in some detail. There are numerous assessment tools and checklists available. For example, the INCH assessment tool (see Appendix B) offers some helpful guidelines. (Also, see Appendix C for resources and references.)

PART 2
USING THE VOCA IN THE CLASSROOM

How Do I Introduce VOCA Use to My Class?

The addition of a VOCA user to your classroom will probably result in some unanticipated situations. We would like to suggest the following activities that will facilitate the integration process: (a) an introduction of VOCAs and VOCA users by an informed user; (b) classroom rules, which describe and define how the VOCA will be used and who will be allowed access to it; and (c) determination of places where the VOCA will or will not be used.

The presence of a VOCA in your school will create a great deal of curiosity and interest, and we suggest that you make this a learning experience for all. We recommend that you use a former teacher or parent as a resource because they have already experienced some of the concerns that you will have. You might also enlist other people in your community — perhaps a special education teacher, a speech therapist, or a university professor who has worked with VOCAs — to do a presentation at your school. Suggest that they discuss what VOCAs are, how they work, explain how a student acquires a VOCA, and give examples of how the device sounds. You might contact the vendor to ask is there is a videotape available. Being able to see a VOCA user "in action" often helps to demystify this process. You might also suggest that staff (and students) spend a period of time (30-60 minutes) as a nonspeaking individual, to bring about sensitivity to the impact of this disability.

How Will the VOCA Affect the Classroom?

Having a VOCA user in the classroom will result in many changes, including attitudes, structure, and space. Every VOCA user (just as every one of us) is a unique individual, with varying needs. The VOCA user may require special seating arrangements or methods to secure and access the device. Again, if you're not sure how to deal with wheelchairs or hardware arrangements, go to resources in your school, community, or to vendors and ask questions.

Rather than raising a hand to indicate that he or she wants to participate, the user might activate a buzzer or give eye contact to gain the attention of others. As you get to know the VOCA user, his or her methods may become evident; or you could provide options and jointly determine which will work out best within the school setting..Don't forget to use former teachers and parents as resources.

Every VOCA has different features, some of which may expand classroom performance. Some examples include: the *Light Talker's* ability to act as an alternate keyboard for a computer; the *WOLF's* ability to activate battery-operated toys in conjunction with speech production; the *SpeechPAC's* ability to act as an environmental control interface. Some VOCAs have features that can be adapted for other classroom applications.

Should Other Students Be Allowed to Touch the VOCA?

After your initial introduction, you may continue to have concerns regarding who should be responsible for the VOCA, or have access to it. Often, other student may attempt to help the VOCA user, resulting in several potential problems. First, the user should be consulted and should indicate whether or not he or she would like assistance. Sometimes, in our effort to "help," we may fail to realize that students with disabilities want or need to do things on their own, being as independent as possible in all situations. It's fun to operate a power chair or VOCA, but your other students may need to be reminded that these are tools that belong to and help the student with disabilities participate in classroom activities. On the other hand, nonusers may be engaged to prompt or model communication strategies with the VOCA. This may be an excellent training technique, and may serve to reduce frustration when the VOCA user is confused or exposed to new tasks. It may also help other students learn language, communication, and social concepts.

How Should the VOCA Be Integrated Into the Academic Curricula?

It is impossible to detail training strategies in this booklet, but several sources of sample strategies are available through national and local organizations, such as the American Speech and Hearing Association (ASHA) and the United States Society for Augmentative and Alternative Communication (USSAAC), which present training and curricula (see Appendix C). We suggest that you contact these organizations, explain your needs, and ask if they can provide assistance. What we can offer here is some broad-based suggestions for most classroom VOCA users. It is amazing to contemplate the cognitive processes and skills one can facilitate with a VOCA, such as the following:

- Awareness of cause and effect — simply the push of a switch produces something.
- Comprehending a means to an end and therefore learning to initiate requests. By programming a word for something that the student has demonstrated he or she consistently enjoys, and placing the VOCA in a strategic location for the student to activate, the student can learn that the VOCA is a means to an end; that is, the student activates the sound and gets the desired object.
- Indicating preferences. By programming simple choices of leisure activities or locations in the room, the teacher can encourage the student to self-determine some preferences.
- Participating in songs or nursery rhymes — learning to anticipate "events" that occur in "predictable" rhymes or stories.
- Creative, exploratory play. Children can role-play adult activities, such as talking to dolls or going to the store.
- Conveying messages. Students learn concretely communicative responsibility.
- Participating in "circle" routine activities. Rote skills such as calendar words can be elicited, class jobs chosen, and weather referred to and indicated. The visual reinforcement on overlays, as well as the auditory feedback, assists in the initial learning and retention of these concepts.
- Acquiring and displaying social rituals (courtesies), such as saying "please," "thank you," "hi," "good-bye," and "What's your name?"
- Memorizing series, such as days of the week.
- Organizing information, such as how prepositions and concept words relate to each other by seeing their graphic representation.
- Acquiring sight word recognition.
- Using the device as a "dictionary" reference when spelling.

- Developing a sense of phonics for reading and spelling. Many VOCAs have the ability to phonetically produce sounds from the English language; such a programmed level can be used during spelling, writing, and reading.
- Participating in class performances and skits.

As is apparent from this list, you should approach the VOCA user as you would any other learner in your classroom, except that this student has a machine that facilitates fuller participation. Your focus should not be centered around teaching the student how to use the VOCA, but rather using the device as a learning tool.

We encourage teachers to learn to program VOCAs, enlisting support from previous teachers or therapists, community resources, parents, or direct care givers. Initially, programming a VOCA may be a very intense task, but stay calm and stick with it. As with any other new skill, it simply takes practice and review of the VOCA manuals provided by the manufacturer.

How Does the VOCA Encourage Socialization?

In addition to learning social rituals with the VOCA, students also engage in conversation and humor. It is our experience that these are often learned beyond our expectations — a sort of experiential, incidental learning occurs. It is helpful to program in humorous quips and even jokes or riddles to expedite the process, but the most fun often comes from student "self-communication" strategies. One student, for example, tried flattery to get the teacher to cut a lesson short: he said (with the VOCA), "You are pretty." At the other end of the spectrum, of course, was the boy who put his phonics lessons to quick use by producing letter-by-letter expletives on the bus for the entertainment of all his peers. Another boy, asked to spell the word "fish," tired of demonstrating his spelling prowess, summarily turned to the food page, activated the cell with the food item "fish" on it, grinned, and quickly shut down his machine. One student established his assertiveness during a classroom discussion of the calendar and upcoming events by interjecting, "My birthday is May 3." This was an individual who was not about to be overlooked or forgotten in the "regular" routine of things. All of these instances certainly helped students express their unique personalities.

PART 3
USING THE VOCA IN THE COMMUNITY

A current trend in providing services to people with multiple disabilities is community-based training. Through this approach, these students learn to use their local community services, such as libraries, fast food and other restaurants, grocery stores, and banks. The students also participate in employment opportunities.

As mentioned previously, a VOCA is only one component of the student's entire communication system. When doing community-based training, teachers should be concerned with all aspects of the student's communication, including the following:

- Using language appropriately in social contexts *(pragmatics)*; for example, having the student approach a store clerk and being close enough to be heard before making a selection.
- Being aware of timing in communication *(Chronemics)*; for example, responding promptly in a turn-taking situation.
- Making choices; for example, selecting items from a food menu.

Some community-related skills can be practiced in the classroom, such as the following:

- Personal identification.
- Manipulating money and numbers.
- Transporting and manipulating the VOCA and overlays.
- Efficiently using community-based vocabulary (e.g., names of the burgers at a fast food restaurant, sizes of different food items, and survival words such as "push," "in," and "restrooms").
- Turn-taking — both conversational and physical (e.g., waiting in line at a drinking fountain).

Most skills, however, are best trained in real-life situations where the student experiences all of the steps in the activity. Not only is the isolated skill learned (producing a fast food order), but the student learns the entire activity, including those events that precede and follow this skill which facilitates skill acquisition and generalization. In addition, community-based training reveals other skill areas that need to be addressed, as indicated by the following scenario.

An ambulatory VOCA user was taken to a fast food restaurant. After placing and receiving his food order, he took the food to his seat and left his VOCA on the restaurant counter. This was discussed by the educational team, with the following solution. During subsequent trips to fast food restaurants, the student was prompted to put his food tray on top of his VOCA (which was in a case), carrying both at the same time. This "trial" ended up working well, and there have been no further problems.

Another student had to learn to grasp her food tray with one hand, while carrying her VOCA (by a handle) with the other. A shoulder strap would also be an option for some students. A student in a wheelchair might have to use the VOCA to ask that the food order be placed on his or her lap tray.

As with academic studies, numerous community-based programs and training suggestions are available through national and local agencies. Just ask!

Before conducting community-based training, you should engrave the VOCA with the student's name and social security number and attach a luggage tag that provides a phone number in case it is lost. Satchels and bookbags serve as good cases for VOCAs. The devices do get lost, broken, misplaced, and stolen; and batteries go dead at the most inopportune times. If such mishaps occur, rest assured, it has probably happened to someone else, too.

There may be some environments, such as amusement parks, that are hostile to VOCA use. You should confer with the VOCA user and professionals on the advisability of taking the VOCA to such environments. You may want to make other provisions, such as using activity-specific communication boards or just the overlays of the VOCA. Before such outings, do an environmental inventory (check out the territory) and plan well in advance.

PART 4
PRECAUTIONS AND TROUBLESHOOTING

Helpful Hints and Precautions

Read the Manual

Even if it seems like Greek — try. Familiarity and time will comfort you. Documentation has become more readable because people took the time to read the manuals, and then voiced their frustrations to the vendors and manufacturers. Now manuals usually provide a "guided tour," which walks you through the use of the device. One valuable section is the "troubleshooting" section. This section generally makes no assumptions; it will remind you to do basic things (like check to see if the battery is charged) before you get panicky or before you call the manufacturer. In addition, this section gives you guidelines on how to organize and explain the problems to technicians. Many manufacturers also include teaching strategies that have proved very helpful to some trainers.

Know the Resident Vocabulary

Become familiar with the vocabulary residing on the device. You may not be in charge of determining the original vocabulary, but the user or the parent will know what vocabulary is really used or needed. Your familiarity with the vocabulary and where it is located will allow you to facilitate the student's access; therefore, communication will flow more smoothly.

Gather Information

Solicit information from significant others (family, former teachers, and friends) and from vendors and other people using similar technology. This will help you avoid many pitfalls, develop realistic expectations, provide for transitional use, and increase trust and acceptance levels. Also, share your gained knowledge with others. Teaching is a great way to clarify your thoughts and internalize information. We encourage you to make connections with the following national organizations: Center for Special Education Technology (800/873-8255), American Speech, Language, and Hearing Association (800/638-6868), United States Society of Augmentative and Alternative Communication (c/o ACS) (800/247-3433), and Alliance for Technology Access (415/232-0621).

Find an Expert

Seek out a competent VOCA user to give classroom demonstrations, particularly in the context of a lesson. This is a consistent recommendation of teachers, vendors, and others consulted in the preparation of this booklet.

Have Reasonable Expectations

If students are not allowed to talk out in class, have the same requirement of the VOCA user. If use of the device in a certain setting impedes learning (for example, a student in training to be a dishwasher), recognize that and deal with it. Don't feel guilty about not letting the student use the VOCA in certain situations. You may be better safe than sorry.

Make Backups

Make overlay back-ups in case of spills and losses. Also keep copies of overlays on file for easier revisions.

Avoid Hazards

Be aware of the possible hazards of moisture and static electricity. Avoid water hazards, and ground the user when static seems a likely possibility. The static electricity that people acquire in dry atmospheres can be transmitted to objects they touch (in this case a VOCA) and can cause disruption in current and a malfunction of the system. Grounding yourself on a rubber surface, particularly if you are standing on an unpainted metal surface, is a worthwhile precaution. Another remedy to prevent static discharge when turning on the VOCA is to use an anti-static softener sheet (used in home dryers). There are several commercial products available to dissipate static electricity, including anti-static mats and sprays available at most computer stores.

Stay Calm

Become a calm, effective troubleshooter, checking first for the obvious: power supply, loose connections, adjustable device features (e.g., display and volume). Know when to call for help and trust that the technicians do want to help. Be brave and resourceful ... be a "teacher."

G-L10

VOCA TROUBLESHOOTING CHECKLIST

- Is the VOCA turned on?
- If there is a display control knob, does it need to be adjusted?
- If there is a volume control knob, or internal (software) setting, does this need to be changed or adjusted?
- Check to make sure that the overlay you are trying to use corresponds to the level or page of the program that you're in.
- Check to make sure that you are in the right "mode" (for example, spelling mode vs. language production mode).
- Does the VOCA use batteries? Have they been charged, or do they need to be charged?
- If the VOCA has been charged and still does not work, is there a short in the charger? Try using another charger. (*Please* make sure that you are using the charger that was designed for or came with your VOCA.)
- Does the device use rechargeable batteries? Have they been replaced recently? Even rechargeable batteries eventually must be replaced.
- If you are on an unpainted metal surface, *please* be sure that you ground yourself by using a rubber mat, before using your VOCA.
- Check the troubleshooting guide provided by your VOCA manufacturer.

When to Call for Help

If you need to call the vendor for assistance, it helps to have the telephone near the VOCA. Have the following information available:

- The VOCA type.
- Name, version, and serial number of the device.
- What happened or what didn't happen.
- The steps you have already taken or tried to solve the problem.

Keep serial numbers and names of equipment in a loose-leaf notebook with blank pages for recording problems and solutions.

PLEASE KEEP A COPY OF THIS CHECKLIST IN A CONVENIENT LOCATION!

APPENDIX A
GLOSSARY

It's exciting to embrace a new technology that holds so much promise, but there are moments of anxiety in tackling any new endeavor. Part of this anxiety occurs as you encounter new vocabulary. New fields breed new terms to express ideas or processes, and education is famous for its jargon. Just remember that the terms are simply labels for concepts that you learn — in fact, may already know. To take the edge off, here are a few definitions of some prevalent terms in the field of AAC.

Activation: VOCAs can be accessed in a variety of ways. The most straightforward is called *direct selection,* in which the student presses a selected key or cell and the machine "talks." Another type of direct selection involves *pointing* to the cell by means of a light, which activates the chosen cell. Devices can also be accessed by other remote means: (a) a single switch for scanning (pressure, motion, lever, etc.); (b) a panel or array of switches; and (c) a joystick, track ball, or mouse. Consistent, reliable activation is perhaps one of the most important elements in effective VOCA use. Therefore, it is paramount that both trainer and student work toward that end.

Adjustments and modifications: Most devices have adjustable features that are easy to manipulate and will give you some sense of power over this machine. Displays, as suggested before, can be modified, as well as volume. As the need arises, you and your team might want to provide some external modifications to make the device more functionally and cosmetically acceptable. Modifications that can be made include: homemade carrying cases, attached handles or easels, and attached pointers for greater pressure on the cells.

Dedicated device: Voice output communication is produced by some type of computer processor. When that processor's primary or exclusive function is to process and produce communication, it is considered dedicated. Because of the memory requirements to produce speech and to store codes for speech, currently most devices are dedicated. Therefore, you need to recognize that expecting other functions (such as calculating, timekeeping, recordkeeping, or word processing) from them is probably unrealistic. In some cases, the computer base of the device is well equipped to handle these tasks, but shifting from one program to another is risky.

Digitized speech: Speech that is produced from prerecorded speech samples, either as intact words or as segments of words. Flexibility to produce novel utterances depends on how many sounds have been recorded; therefore, the more sophisticated systems use a great deal of computer memory. Although digitized speech would seem to be more intelligible and of higher quality, other factors play into the overall effect, including the speaker system of the device.

Displays: This generally refers to an LCD (light cathode display) or LED (light emitting diode), which may well enhance the intelligibility of a device by giving feedback to the sender for self-correction and providing clarification to the message receiver. Most displays feature a control that can adjust the lines for viewing at various angles.

Fixed vocabulary: This term is somewhat misleading because it applies to two kinds of VOCAs. Fixed vocabularies are the words that are programmed into the device by the manufacturer. In some cases, these cannot be altered; in other cases, you may submit revisions for the manufacturer to reprogram.

Overlays: This refers to a word or picture page that is placed over the device to indicate which key or cell will produce the intended messages. Generally these overlays are gridded and may have either words or pictures representing concepts. These cues enable the student to locate and identify keys (cells) for specific message production. (These are analogous to letters on typewriter keys.) The overlay or overlays may also be removable or duplicated and serve as a ready-made communication aid when the actual device proves too cumbersome for some situations or is in need of repair.

Power supply: Currently devices have rechargeable batteries, but caution should be taken to make sure that they are charged the recommended amount of time with the correct cord. Frequent charging, when batteries have not been sufficiently discharged, may diminish the capacity of the battery to accept a full charge.

Programmable vocabulary: All vocabulary is "programmed"; however, this term refers to devices that can be programmed on site by trainer or student, as opposed to being returned to the manufacturer.

Synthesized speech: Speech that is produced by synthesizing (blending) a limited number of sound segments. Because it is simply a combination of established sounds, it tends to sound robotic.

VOCA: Voice output communication aid, generally a device that uses computer-generated speech for communication.

Volume control: This may refer to either a volume control dial affixed to the device, or volume control options within the VOCA software or program. In addition to volume controls, some VOCAs may include an ear jack for privacy or auditory feedback for people with visual impairments (for message selection).

APPENDIX B
DEVICES AND VENDORS

Adaptive Communication Systems, Inc.
354 Hookstown Grade Road
Clinton, PA 15206
800/247-3433; 412/264-2288
SpeechPAC, Alltalk, RealVoice, Dyna Vox, ScanPAC, EvalPac with RealVoice

Artic Technologies
55 Part Street, Suite 2
Troy, MI 48083-2753
313/588-7370
Artic D'Light, Artic Crystal

Audio Bionics
9817 Valley View Road
Eden Praire, MN 55344
800/328-4827, ext. 1400
Lifestyle Personal Communicator

Canon U.S.A., Inc.
One Canon Plaza
Lake Success, NY 11042
516/488-6700
Canon Communicator M

Crabapple Systems
803 Forrest Avenue
Portland, ME 04101
207/797-2388
SpeechBox, SpeechPad

Crestwood Company
6624 North Sidney Place
Milwaukee, WI 53209
414/352-5678; FAX: 414/352-5679
Portable Pocket Computer

EKEG Electronics Company, Ltd.
P.O. Box 46199, Station G
Vancouver, BC V6R 4G5 Canada
604/273-4358
Keyboards for Speak N' Spell

Eyegaze Computer System
LC Technologies, Inc.
4415 Glenn Rose Street
Fairfax, VA 22032
703/425-7509
Eye Controlled Communicator

F. Keep Company
22501 Mt. Eden Road
Saratoga, CA 95070
408/248-2579; 408/741-5368
CATT 425 and 525

Innocomp, Innovative Computer Applications
33195 Wagon Wheel
Solon, OH 44139
216/248-6206
Say-it-All II and II plus

Phonic Ear Inc.
250 Camino Alto
Mill Valley, CA 94941
800/227-0735; 415/383-4000
VOIS 136, VOIS 160

Prentke Romich Company
1022 Heyl Road
Wooster, OH 44691
800/642-8255; 216/262-1984 (Ohio)
IntroTalker, Smoothtalker for Light Talker and Touch Talker, Light Talker, Touch Talker

Sentient Systems Technology, Inc.
5001 Braum Boulevard
Pittsburgh, PA 15213
412/682-15213
EyeTyper 300

Shea Products, Inc.
1721 West Hamilton Road
Rochester Hills, MI 48309
313/852-4940
Special Friend Speech Prosthesis

Sonoma Developmental Center
Communication Engineering
15000 Arnold Drive
P.O. Box 1493
Eldridge, CA 95431
707/544-1573
Sonoma Voice

Dr. Douglas Sorenson
5937 Portland Avenue South
Minneapolis, MN 55417
612/866-1661
Rescue Speech System

TASH, Inc.
70 Gibson Drive Unit 12
Markham, ON, Canada, L3R 4C2
416/472-2212
Talk-O

Venture Technologies
110-340 Brooksbank Avenue
North Vancouver, B.C., Canada, V7J 2C1
604/986-9803; 800/663-8931 (In U.S.)
TurboSelect™

Wayne County Intermediate School District
Attention: Greg Turner
33500 Van Born Road
Wayne, MI 48184
313/467-1415
WOLF, ScanWolf

Words+, Inc.
P.O. Box 1229
44421 10th Street, West
Suite L
Lancaster, CA 93535
805/949-8331
AudScan II, Equalizer, Talking Board

Zygo Industries, Inc.
P.O. Box 1008
Portland, OR 97207
503/684-6006
Macaw, Lightwriter, Scribe, Zygo Talking Notebook II, Switchboard

Other

Inch Associates
9568 Hamilton Avenue
Suite 104
Huntington Beach, CA 92646
INCH Assessment (International Checklist for Augmentative Communication)

Don Johnston Developmental Equipment, Inc.
P.O. Box 639
1000 North Rand Road, Building 115
Wauconda, IL 60084
312/526-2682
Oakland Schools Picture Dictionary

APPENDIX C
RESOURCES

Journals and Newsletters

AAC: Augmentative and Alternative Communication Journal, Williams & Wilkins, P.O. Box 2391, Baltimore, MD 21203; 800/638-6423.

Augmentative Communication News, One Surf Way, Suite 215, Monterey, CA 93940.

Closing the Gap, P.O. Box 68, Henderson, MN 56044; 612/248-3204.

Communicating Together, Easter Seal Communication Institute, 250 Ferrand Drive, Suite 200, Don Mills, Ontario, Canada M3C 3P2.

Communication Outlook, ℅ Artificial Language Laboratory, Computer Science Department MSU, East Lansing, MI 48824

Computer Disability News, National Easter Seal Society, 2023 W. Ogden Avenue, Chicago, IL 60612; 312/243-8400.

The Exceptional Parent, 1170 Commonwealth Avenue, Third Floor, Boston, MA 02134.

Organizations

Applied Science and Engineering Laboratories, University of Delaware/A.I. duPont Institute, 1600 Rockland Road, Wilmington, DE 19899; 302/651-6830.

ASHA (American Speech-Language-Hearing Association), 10801 Rockville Pike, Rockville, MD 20852-3279; 301/897-5700.

Council for Exceptional Children, 1920 Association Drive, Reston, VA 22091; 703/620-3660.

RESNA, 1101 Connecticut Avenue NW, Suite 700, Washington, DC 20036; 202/857-1199.

TASH (The Association for Persons with Severe Handicaps), 7010 Roosevelt Way N.E., Seattle, WA 98115; 206/523-8446.

Trace Research and Development Center, 314 Waisman Center, 1500 Highland Avenue, Madison, WI 53706-2280.

USSAAC (United States Society for Augmentative and Alternative Communications), ℅ ISAAC, P.O. Box 1762, Station R, Toronto, Ontario, Canada M4G 4A3.

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APPENDIX D

(This appendix is a partial printing of a Tech Use Guide developed for the Center for Special Education Technology by Beth Mineo.)

Tech Use Guide — Using Computer Technology

Augmentative and Alternative Communication

Augmentative and alternative communication (AAC) refers to any approach designed to support, enhance, or augment the communication of individuals who are not independent communicators in all situations (Beukelman, Yoder, & Dowden, 1985). Communication augmentation is appropriate for those who experience difficulty with the spoken and/or written forms of expressive communication. It is important to note that an individual's communication system should not be a single device or technique, but rather a collection of techniques, devices, and strategies that can be employed as the communicative situation warrants. Components of this collection include gestures, facial expression, writing, residual speech, signal systems, nonelectronic communication systems of various sizes and complexity, and electronic AAC technology.

Benefiting from AAC Approaches

AAC approaches benefit individuals with severe difficulties in speaking and/or writing. For those whose oral-motor dysfunction is so severe that speech is not intelligible, AAC approaches provide an alternate method of expression. Individuals with limited arm and hand movements can take advantage of alternate access to print capabilities. AAC approaches with spoken output can assist individuals with low vision, and AAC systems with visual display and print capabilities can assist individuals with hearing impairments. AAC approaches may also be beneficial for individuals with cognitive impairments, not only as a means of expressive communication but also as a language learning tool.

"Low Tech" Approaches

There are many AAC approaches that do not involve sophisticated technology. These approaches may be implemented in isolation, but they more often serve as components in a comprehensive AAC intervention.

Signal Systems. These systems permit an individual to call for help, attract attention, and answer simple yes/no questions. Such systems usually consist of a switch and a signal of some type. The switch is placed in proximity to a body part that the user can move easily and reliably. The signal could be a buzzer or chime, or it could be a tape-loop saying "Come here" or "I need help." Some individuals may be able to use the signal for simple coded messages (for example, one buzz means yes, two buzzes means no, three buzzes means I don't know) or for Morse code.

Communication Boards. This term refers to any display containing vocabulary choices from which the user selects a message. Low tech communication boards are those without electronic components. They can be made using a variety of materials, including wood, plexiglass, posterboard, notebooks, and paper. Communication board displays may contain objects, letters and numbers, words, phrases, photographs, or graphic representations. Brandenburg and Vanderheiden (1988) summarized the many factors that must be considered in the design of a communication board. These include:

- The physical technique the individual will use to select message components from the display.
- The types of symbols to be used on the display.
- The vocabulary items to be included.
- The arrangement of vocabulary on the display.
- The interaction strategies that the augmented communicator will use.
- The attitudes and communication styles of the augmented communicator and potential communication partners.

An individual might have a single board that contains letters and numbers and enough words and frequently occurring phrases to meet most of his communication needs. A student might use different mini-boards for different academic subjects or for different settings (playground, mall, Sunday school). Communication boards also serve as a back-up system should the user's electronic system fail.

"High Tech" Approaches

The incorporation of microprocessor technology into AAC systems has made a number of valuable features possible.

Large Vocabulary. Many AAC systems offer vocabulary capacities in excess of 2,000 entries. The challenge for the user is the management of such large vocabularies, because most systems have static displays containing a finite (and relatively small) number of items. Systems such as *Say-it-All II Plus, scanWRITER*, and *VOIS 160* store vocabulary at a number of levels, requiring the user to activate the appropriate level as well as the correct location on the display in order to make a message selection. Users often consult a glossary that lists available vocabulary along with the activations that are required to access each item.

Several approaches have been designed to minimize the memory demands on the user. All of the devices mentioned thus far can accommodate multiple overlays, one corresponding to each memory level. A new device, *The Talking Screen*, offers a dynamic display — the display itself changes, permitting each level to be displayed without any manual changing of overlays. *The Touchtalker with Minspeak* uses multimeaning icons to facilitate access to vocabulary items not visible on the display. The user codes his vocabulary selections with meaningful sequences of pictures, and thus doesn't need to remember a large number of letter or number codes.

Output Displays. Many devices contain LED or LCD areas for display of messages. As the user makes a selection, the words appear in the display. This permits the user to review the message, and serves as a medium for the communication exchange between partners. Many systems also generate hard copy (print on paper), a useful feature when a permanent record of communication is desired.

Speech Output. One of the most significant advances in AAC has been the availability of spoken output. Speech output renders technology accessible to those who cannot read and those with visual impairments. It also makes communication possible in the traditional auditory modality. Some devices, like the *Mini Talking Card Reader*, record short segments of a speaker's voice onto magnetic tape. Devices like the *Wolf* and *Touchtalker* produce synthesized speech, which is created by subjecting text to a set of pronunciation rules.

The appeal of synthesized speech is its flexibility. Any utterance that can be entered as a text string can be produced, resulting in the potential for unlimited vocabulary. The sophistication of speech synthesizers varies, as does the quality of the speech they produce. Generally, research has demonstrated that *Echo, Votrax,* and *Smoothtalker* speech are significantly less intelligible than *DECtalk* speech (Mirenda & Beukelman, 1987).

An alternative to synthesized speech is digitized speech. In this approach, the speech is digitally recorded, modified for storage in the system, and then reconstructed as spoken output. Although this process yields much more natural-sounding speech, it is very memory-intensive. It is also less flexible than synthesized speech because only prerecorded output can be used. Among the AAC systems offering digitized speech capabilities are the *Introtalker, ALLTALK*, and *Parrot.*

Input Modes. Advances in input technology facilitate access to AAC systems for individuals with the most severe motoric limitations: almost any physical movement now can be harnessed to control communication systems. For example, the *P-Switch* can be activated by almost any muscle movement and can be used to control scanning communications systems. *Voicescribe-1000,* a voice input system with a potential 1,000-word vocabulary, can be used by individuals with consistent vocal output who need to access written communication options. *Freewheel* is a cordless device that allows head-pointing and other body motions to be used to access standard software on a personal computer.

Rate Enhancement Techniques. Several AAC systems incorporate features that improve the efficiency of communication for the user. Prediction routines, such as those found in the *Portable Anticipatory Communication Aid* (PACA) and *Equalizer,* learn the word usage frequencies of the user. When the user begins entering a word, the system responds with the most frequently used words beginning with that letter sequence. Abbreviation routines, as found in the *RealVoice*, allow the user to access items in memory using abbreviation. For instance, the system might be programmed to produce "See you later" with the single keystrokes "C-U."

Customizability. Each individual has unique communication needs, and it is important to be able to customize a system to meet those needs. Many systems come with a standard vocabulary, but allow the user or caregiver to program in additional vocabulary as needed. Similarly, most systems offer the consumer the option of customizing overlays to make them appropriate to the user's cognitive and linguistic abilities.

Assessment and Intervention

Every user presents a unique constellation of needs and abilities, and the range of available AAC systems expands yearly. The process of matching user needs to appropriate interventions should involve thorough evaluation and careful consideration of options.

Potential consumers of AAC interventions may demonstrate deficiencies in motor abilities, cognitive abilities, language skills, social/emotional development, and performance of activities of daily living. All of these areas should be evaluated, because AAC intervention will be affected by them and will in turn exert some influence on them. The need for such a comprehensive approach requires that input be derived from a multitude of sources. A team approach is essential, with expertise being shared among parents, potential AAC consumers, teachers, aides, speech/language pathologist, occupational therapists, physical therapists, medical personnel, ophthamologists, audiologists, educational diagnosticians, psychologists, social workers, rehabilitation engineers, and others with pertinent input. Several protocols have been developed to guide the assessment process (see Beukelman, Yorkston, & Dowden, 1985 and Blackstone, Cassatt-James, & Bruskin, 1988).

It should be emphasized that AAC assessment and intervention are not discrete events, but rather components of the process of assisting an individual to reach his or her highest potential. Contrary to popular belief, the process is not completed when a consumer acquires an AAC system. Understanding of AAC has matured in the past decade, and most people now realize that successful communication abilities do not emerge automatically as a function of device acquisition. Communication skills must be taught, with the goal being the achievement of **communicative competence**. Light (1989) defines a competent communicator as one whose communication is functional, adequate, and skilled in regard to the linguistic, operational, social, and strategic aspects of communication. A competent communicator is one whose communication can meet the demands of daily life. The communication does not have to be perfect, because no one is a perfect communicator. Rather, the user should demonstrate an adequate grasp of vocabulary and grammar, adequate operation of the AAC systems, appropriate interaction skills, and the ability to employ compensatory strategies to enhance communicative effectiveness.

Attention should be directed toward all of these abilities during training. Furthermore, training should be provided not only for the augmented communicator, but for the communication partners as well. Caregiver training could almost be considered a prerequisite for success. Without interested, encouraging, skillful partners, many of the augmented communicator's opportunities for learning and practice would be lost. Given the importance of early success to later motivation and effort, it is essential that training be directed at both sides of the communication dyad.

Crucial Intervention Issues

Training Interaction Strategies. So often people with severe expressive communication problems learn to assume a passive role in communication interactions. They get lots of practice responding, but little experience initiating. Thus, AAC intervention must include explicit instruction in interaction behaviors and strategies. AAC consumers must learn that there is no single correct way to interact with all communication partners: The interaction strategies employed should be selected on the basis of the communication task, the setting, and the skills and attitudes of the partner. Consumers must learn how to get attention, introduce topics, negotiate meaning, interrupt, convey emotion, take turns, and resolve communication breakdowns. They need to learn to work with their communication partners to maximize the successful transfer of information. Kraat (1987) provides an excellent overview of this topic.

Promoting Language and Literacy Skills. The lack of language and literacy skills limits an individual's AAC options. Systems based on spelling, or those requiring knowledge of morphological and syntactic conventions, are inaccessible to individuals without sufficient language and literacy skills. Difficulties with these skills often hold students back from academic achievement and prevent adults from performing adequately at the job site. This topic has just recently begun to be addressed in the literature. Blau (1988) suggested a four-phase approach to developing literacy in young children that emphasizes a positive reading experience, development of a sight work vocabulary, an introduction to phonics, and the development of sentence comprehension. Very young children who have had access to a symbol-based communication system may have an inherent understanding of symbolic representation, lessening the difficulty of the transition to the written word.

Children who are nonspeaking do not have the opportunity to practice sound/letter correspondence orally, so interventionists must emphasize these relationships in other ways. Access to an AAC system may provide an individual with his first opportunities to experiment with sound combinations (if the system has voice output) and language manipulation. Cohen (1988) suggests ways in which word processing software developed for the regular education market can facilitate the development of literacy skills.

Vocabulary Selection. An AAC consumer's communicative effectiveness and efficiency can be enhanced if the system provides access to the appropriate vocabulary. There are many techniques that one can use in making vocabulary determinations. In all cases, it is crucial to approach this task in terms of what the consumer wants and needs. Yorkston and her colleagues (1989) described several methods to employ when selecting vocabulary:

Environmental inventories — This approach to vocabulary selection involves a survey of each of the environments in which the AAC consumer interacts to determine the people and objects present and the activities that are likely to occur. From these observations, lists of potential vocabulary items can be generated.

Communication diaries — AAC system vocabulary should be updated frequently to reflect changes in the user's lifestyle and communicative interactions. To facilitate this updating, the consumer can compile a history of communications either by printing and saving all output (if the system has this capability) or by having someone record the communications for a period of time. Analysis of this record will reveal those items used frequently that are not available in the vocabulary.

Vocabulary list review — Another excellent technique is the review of vocabulary lists. It is difficult to generate vocabulary items spontaneously, but much easier to recognize appropriate words on a list. A review of standard lists is also helpful in identifying the structural words essential for grammatically correct utterances. Often these words are overlooked because the focus is on listing words that will expand the content of a user's communication.

Blau (1986) offers some guidelines for evaluating the utility of selected vocabulary. Among her criteria are:

- Can the item be used to code a variety of communicative functions?
- What is the potential for recombination of the item?
- How frequently is the item used, and in what settings?
- How much information is conveyed by the item?
- How high in reinforcement value is the item for the consumer?
- Does the item have potential for peer interaction and play?
- How much interest does the item hold for the consumer?

In determination of vocabulary, as in all aspects of assessment and intervention, the consumer should be involved in the process to the greatest extent possible.

Availability Information

Trace Resourcebook: Assistive Technologies for Communication, Control, & Computer Access. Available from the Trace Center, address above.

Wallchart on Commercially-Available Communication Aids. Available from Applied Science and Engineering Laboratories, address above.

Assistive Technology Sourcebook. Available from RESNA, address above.

ABLEDATA (product database). Available from Adaptive Equipment Center, Newington Children's Hospital, 181 East Cedar Street, Newington, CT 06222, 800/344-5405.

Products Mentioned in Text

ALLTALK, FreeWheel, RealVoice. Adaptive Communication Systems, Inc., 354 Hookstown Grade Road, Clinton, PA 15026, 412/264-2288.

Mini Talking Card Reader. Crestwood Company, P.O. Box 04606, Milwaukee, WI 53205, 414/461-9876.

Voicescribe-1000. Dragon Systems, Inc., 55 Chapel Street, Newton, MA 02158, 617/965-5200.

Say-It-All II Plus. Innocomp, 33195 Wagon Wheel, Solon, OH 4439, 216/248-6206.

VOIS 160. Phonic Ear Inc., 250 Camino Alto, Mill Valley, CA 94941, 415/383-4000.

Introtalker, Touchtalker, P-Switch. Prentke Romich Company, 1022 Heyl Road, Wooster, OH 44691, 216/262-1984.

Equalizer, Talking Screen. Words +, Inc., P.O. Box 1229, Lancaster, CA 93535, 805/949-8331.

Parrot, scanWRITER, PACA. Zygo Industries, Inc., P.O. Box 1008, Portland, OR 97207, 503/684-6006.

Readings

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This guide was prepared by Beth Mineo. Dr. Mineo is employed as a certified speech/language pathologist and an associate scientist at the Applied Science and Engineering Laboratories. University of Delaware/ A. I. duPont Institute. She is also an assistant professor in Educational Studies, University of Delaware. She brings many years of clinical experience ranging from her work in preschool, public school, a rehabilitation hospital, ICF/MR facilities, and private practice. She has been involved in the development and evaluation of a variety of assistive technology devices.

SORTING THROUGH AUGMENTATIVE COMMUNICATION
MOFFITT & DETERDING, 1990

	ACCESS		FLEXIBILITY		SYMBOL USE						VOICE					COST	
Equipment	direct	non-direct	user program ability	vocabulary size	printed output		visual output	pict	word	letter number	gender avail.	pitch varia.	volume control	intelligibility (subj. scale 1-5)	dig/ syn	Approximate Cost	MAN/ Ven#
					built-in	opt.											
Light Talker	x	x	x	Virtually Unlimited Mult. softw. pkgs. avail.		x	LED	x	x	x	(x with new voice)	x	x	4-5	S	$4290 - (new voice $300)	11
Talker II	x		x	250 store text/speech			x	x	x			x	Digital 7 levels	3-4	S	$2495	6
Sonoma Voice	x		Programmed by manufacturer	64-256 phrases				x	x	x			x	4	S	$414-440	14
Touch Talker	x		x	Virtually Unlimited Mult. softw. pkgs. avail.		x	LED	x	x	x	(x with new voice)	x	x	4-5	S	$3695 - (new voice $300)	11
All Talk	x		x	Level I- 606 words Level II- 1200 words				x	x	x	x	(x)	x	4-5	D	$2995 Lev. I $3995 Lev. II	1
Wolf	x		x	User 800 words, fixed 500 words				x	x	x				3-4	S	$275	20
Scanwolf		x	x	User 800 words, fixed 500 words				x	x	x				3-4	S	$375	20
Vocaid	x		Preprogrammed	5 overlays 36 squares				x	x	x				5	S	$148 - 300	3, 7, 16, 17
Speech Friend Speech Prosthesis	x	x	x	26 x 26 memory loc.			LCD	x	x	x		low med, hi	x	4	S	$2390 Direct $3250 Scanning	13
Lightwriter	x		Limited	12 stored phrases, 33 words, 20 keys, 250 char. ea.	x		2 LED user > listener			x		x	x	3-4	S	$5500	23
VOIS 160	x		x	Virtually Unlimited			x	x	x	x				4-5	S	$3595	9
Zygo Talking Notebook II	x		x	Virtually Unlimited		x	x			x		x	x	4	S	$1495 - 2495	23
PACA		x	x	750 word memory 55 x 20 charac. line	x				x				x	4	S	$2850	23
Tiger, Jr.	x		Preprogrammed	375 words need Magic				x	x				opt.	3-4	S	$150	18

	ACCESS		FLEXIBILITY				SYMBOL USE					VOICE			COST		
Equipment	direct	non-direct	user program ability	vocabulary size	printed output built-in	opt.	visual output	pict	word	letter number	gender avail.	pitch varia.	volume control	intelligibility (subj. scale 1-5)	dig/ syn	Approximate Cost	MAN/ Ven#
Talk-O	x purch.	x separately	x	120 sec. recording time				vary	by	access method	x	(x)	x	5	D	$2300	16
Speech Pad (converted Power Pad)	x		x	16-255 words or phrases				x	x	x				4-5	S	$899	24
Secretary	x		x	32 sec. 10 brief messages	x		x				x	(x)		5	D	$1995	23
Say-it-Simply Plus	x		x	762 words or phrases						x	x		x	4-5	S	$1350 (1989)	5
Say-it-All II Plus	x		x	846 words or phrases		x	x (opt)			x	x		x	4-5	S	$1595 (1989)	5
Real Voice (Speechpac)	x		x	27,000 characters Virtually Unlimited	x		x	x	x	x	x	x	x	4-5	S	$2895	1
CATT 425	x		x	32 sec.			x (opt)	x	x	x	(x)	(x)	x	5	D	$695	25
Macaw	x		x	1 min (hq) 2 min (ep)						x	x	(x)	x	5	D	$995	23
Scanning Macaw	x	x	x	1 min (hq) 2 min (ep)						x	x	(x)	x	5	D	$1495	23
Eyetyper 300	x eye-gaze		x	Virtually Unlimited		x	x			x			x	3-4	S	$3495	12
IntroTalker	x		x	1 min (norm) 2 min (ep)				x	x	x	x	(x)	x	5	D	$795	11
EvalPac with Real voice	x	x	x	27,000 characters Virtually Unlimited	x		x	x	x	x	x	x	x	4-5	S	$3995	1
Parrot	x		x	32 sec 16 messages						x	x	(x)	x	5	D	$595	23
CATT 525	x		x	120 pre-programmed + 10 brief messages open			x (opt)	x	x	x			x	3-4	S	$695	25
Scanning IntroTalker		x	x	1 min (norm) 2 min (ep)				x	x	x	x	(x)	x	5	D	$995	11

STEPS IN VOCABULARY SELECTION

1. Assess the receptive and expressive language skills of the student using the current AAC aid or technique.
2. Interview significant people in the student's life regarding the appropriateness and effectiveness of the vocabulary previously selected.
3. Review present vocabulary to determine the frequency of use of each symbol/word/phrase/sentence.
4. Evaluate sample lexicons. A lexicon may include alphabet for spelling single words, carrier phrases, or complete sentences.

The vocabulary and lexicon should permit a variety in discourse functions:

=> Plan for power or the opportunity for conversation control (e.g., "That's not what I meant.")

=> Social conversation with peers and interaction with strangers.

=> What words would allow the student to give answers — at home, at school, or among strangers?

=> Is there vocabulary that allows the student to ask questions?

=> List statements that allow:
  a. control of the interaction (e.g., "Ask me a different question.")
  b. guide the listener in the use of the system (e.g., "Adjusting my viewing angle knob. Read my display.")
  c. add flavor to the conversation (e.g., "I don't agree.")
  d. meet physical needs (e.g., "Help me into bed.")

=> Include interjections (e.g., "Good grief! Get a grip on it, Mom!")

=> Provide comments that cue the student's parents to include them in conversation (e.g., "Do you want my opinion? Here's my two cent's worth.")

=> Include high frequency carrier phrases like "I want to ..." with a wide variety of possible filler words (e.g., "eat lunch, go home").

=> For each different setting or environment, identify vocabulary specific to that situation.

=> Select words that represent a variety of different grammatical classes that can be combined in a variety of ways.

FOR A YOUNGER CHILD

Select vocabulary by evaluating activities the child enjoys and can be modified to be more interactive. Consider words for objects and actions that can be requested, people with whom they play, and descriptions of feelings or comments about an activity. Concentrate more on nouns, verbs, and modifiers as opposed to articles, verb tenses, etc.

5. Discuss with the team the functions of the vocabulary.
   a. To give answers
   b. To communicate socially with friends
   c. To participate in social group activities
   d. To communicate efficiently in public
   e. To communicate quickly in all situations
   f. To express novel ideas academically or socially
   g. To express basic needs

6. Identify five of the student's most preferred activities (e.g., eating at fast food restaurants, playing with siblings, scouting, bowling, etc.).

7. Introduce five methods for compiling a functional vocabulary. Select messages with multiple versatility and use — to be used in more than one situation.
   a. **Dialoguing** — choose a familiar routine, and document what the student and his communication partner say to each other during their interaction
   b. **Environmental inventory** — choose a preferred activity and list appropriate words and phrases that the student and his communication partner might say.
   c. **Shadow** — observe the student throughout an activity and record verbatim the sentences produced.
   d. **Role play** — partners act out a situation and record the vocabulary necessary to participate in the interaction.
   e. **Tape record** — through audio or video observation the partners list vocabulary specific to the activity as well as a more generic vocabulary.

Vocabulary selection is an ongoing process and must be re-evaluated and updated as needed.

Adapted from: *Training Caregivers and Facilitators to Select Vocabulary*, Gail Van Tatenhove, March, 1987.

TEN WISHES FROM A STUDENT WHO USES AUGMENTATIVE COMMUNICATION

To help you understand the feelings and thoughts of a student who uses augmentative aids and techniques, children from across the United States were asked, "If you could wish for one thing your teacher would do for you, what would it be?" Below are some of their answers.

1. I wish my teacher would joke with me.
2. I wish my teacher would learn how to work my communication aid.
3. I wish my teacher would stop shouting at me like I can't hear.
4. I wish my teacher wouldn't have a heart attack when my machine doesn't work.
5. I wish my teacher would remember that I don't always spell very well.
6. I wish my teacher would have more patience with me.
7. I wish my teacher would call on me for "Share Day."
8. I wish my teacher would give me enough time to say what I'm thinking.
9. I wish my teacher wouldn't hit my machine when it doesn't work — That's my mouth she's hitting!
10. I wish I could walk and talk like my sister and brother.

LEVEL: GENERAL

GOAL: #5 Gain an overview of augmentative/alternative communication (AAC) system as a means of meeting the needs of young children with severe communication difficulties.

COMPETENCY TYPE: SKILL

OBJECTIVE: Participants will identify specific advantages for young children who utilize AAC systems.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
1. Large group activity Demonstrate one or two simple AAC systems which may be appropriate for use with young children (e.g., Manual Board, Introtalker, Wolf). Manual Board: Describe how it could be used in classroom or for play activity. Electronic Device: Demonstrate storage of a simple message under a symbol/icon and show how it can be retrieved.	1. Gain access to one or two AAC systems from your local SERRC or ORCLISH.	1. If the leader is familiar with scanning and switch use, a device such as Scan Wolf or Scanning Introtalker can be discussed or demonstrated.
2. Large group activity Discuss the use of pictures on a manual board or symbols on an overlay. Present symbols on large paper and ask/discuss what messages they may represent.	2. Draw symbols on sheets of paper or use picture cards. Enlarged symbols from *Picture Communication Symbols* (Mayer Johnson) would also be appropriate.	2. Be sure to discuss the efficiency of using icons or symbols to effectively recall entire messages vs. the need for multiple symbols for multiple words (e.g., a picture of APPLE could convey "I'd like to have a snack.") On some devices (e.g., Touchtalker), a sequence of symbols EYE - APPLE - LIGHTNING BOLT could be chosen to represent the message "I want some fast food." By the same principle of efficiency, this message (five spoken words and/or 21 characters) could be communicated with just one keystroke.
3. Large or small group activity Assist participants in identifying specific advantages to use of AAC systems by young children (e.g., individually determined vocabulary, ability to interact/participate with peers, child has his/her own "voice," increase in autonomy/self-esteem, portability of system, and flexibility of vocabulary can modify as needs progress, etc.).		

LEVEL: GENERAL

GOAL: **#5** Gain an overview of augmentative/alternative communication (AAC) system as a means of meeting the needs of young children with severe communication difficulties.

COMPETENCY TYPE: VALUE/ATTITUDE

OBJECTIVE: Participants will develop an appreciation of the critical need on the part of young children with severe communication difficulties to have access to functional and appropriate AAC systems.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
1. Large or small group activity Ask participants to name activities that are typical of a preschool curriculum that involve expressive communication on the part of children. Record on a Flip Chart or Transparency. Secondly, ask participants to name activities typical of a preschool curriculum for which no communication is necessary.	1. Flip Chart and markers, or blank Transparency.	1. The purpose of this activity is to bring about full realization that communication is an integral part of all that typically occurs in the early childhood educational setting. The child who cannot participate due to an inability to communicate suffers a profound disadvantage which will negatively impact all aspects of development.
2. Large group activity Ask participants to name particular skills which may not develop at a normal rate when communication is not functional. Record on Flip Chart or Transparency.	2. Flip Chart and markers, or blank Transparency.	2. Be sure skills from all domains (e.g., cognitive, self-help, social-emotional, etc.) are mentioned.
3. Small group activity Divide into pairs. Partners are instructed to each take a turn acting out a charade (e.g., a movie title, song, current event, etc.) to the other person. They must communicate the message strictly through nonverbal means — no speech allowed! Partners must try to decipher the message being communicated nonverbally. Ask participants to describe their feelings (e.g., frustration) in attempting to communicate without the availability of speech.	3. Movie titles, songs, or current events on slips of paper — or have participants make up their own.	

LEVEL: GENERAL *(continued)*

GOAL: #5 Gain an overview of augmentative/alternative communication (AAC) system as a means of meeting the needs of young children with severe communication difficulties.

COMPETENCY TYPE: VALUE/ATTITUDE *(continued)*

OBJECTIVE: Participants will develop an appreciation of the critical need on the part of young children with severe communication difficulties to have access to functional and appropriate AAC systems.

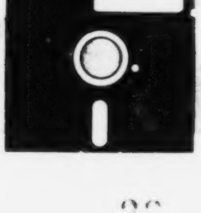
ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
4. Large group activity Present the following ideas and discuss: a. Without a way to communicate, children can experience intense frustration. b. Without a way to interact, children can experience intense feelings of helplessness. c. Frustration and helplessness tend to lead to passivity, "learned helplessness," and other behavior problems.		4. If time permits, describe a specific child's social/emotional/behavior effects, or ask for example(s) from participants.
5. Using the Transparency/Handout as a guide, point out the ways that an appropriate AAC system can break these cycles of secondary delays in developmental progress and subsequent behavior difficulties. Briefly highlight the areas of development which can be enhanced through the use of an appropriate and functional AAC system.	5. Transparency/Handout (G-T6) *Critical Early Childhood Developmental Skills Facilitated Through Use of AAC*	

CRITICAL EARLY CHILDHOOD DEVELOPMENTAL SKILLS FACILITATED THROUGH USE OF AAC

- Awareness of cause and effect
- Comprehending means to an end and learning to initiate requests
- Indicating preference
- Participating in songs and nursery rhymes
- Creative, exploratory play, including role-play
- Conveying messages; learning communication responsibility
- Participating in "circle" routine activities
- Acquiring and displaying social rituals
- Beginning to memorize series, such as days of the week

Adapted from Suddath, C. & Susnik, J., *Augmentative Communication Devices*, CEC Center for Special Education Technology, 1991

Technology



GOAL 6

LEVEL: GENERAL

GOAL: **#6** Gain practical information regarding obtaining funding for assistive technology devices and services.

COMPETENCY TYPE: KNOWLEDGE

OBJECTIVE: Participants will become familiar with a four-step process to seeking and obtaining funding, several primary sources of funding, and key strategies.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
1. Large group activity Discuss a process for obtaining funding. State that although funding can be very complex and time-consuming, it can be made much easier through the gaining of appropriate information regarding the process, and of course, a dedicated and patient advocate! Using Transparency G-T7, *Four Steps to Funding,* briefly overview the four-step process. Highlight the following: **Step 1: Assessment** — Be sure to highlight the importance of a thorough evaluation, consideration of future needs, determination of various possible devices or approaches, and trial periods with devices determined to be appropriate.	1. For purposes of this presentation *Steps to Funding; General Information and Resources for Obtaining Augmentative and Alternative Communication Aids and Services in Ohio* can be obtained. For copies, contact: Diane Dynes, Speech Pathology Department, St. Elizabeth Rehabilitation Center, 601 Edwin Moses Blvd., Dayton, OH 45408. Price is $1.00 per booklet with reduced prices based on number ordered. Your local SERRC Center may also have these available — contact the ORCLISH contact person at your local SERRC. Transparency (G-T7) *Four Steps to Funding* Leader Notes (G-L11) *Funding in Ohio*	1. Transparency G-T7 highlights the booklet described under resources. Additional information regarding several of the Ohio agencies discussed in this section can be found in Leader Notes G-L11. This information is provided for the presenter's benefit, and does not represent a full sampling of possible funding sources nor an entirely complete set of information on these particular agencies.

LEVEL: GENERAL *(continued)*

GOAL: **#6** Gain practical information regarding obtaining funding for assistive technology devices and services.

COMPETENCY TYPE: KNOWLEDGE *(continued)*

OBJECTIVE: Participants will become familiar with a four-step process to seeking and obtaining funding, several primary sources of funding, and key strategies.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
Step 2: Determining a Funding Advocate and Developing Funding Strategies — Cite the fact that research has shown that the most critical component of the funding process is the determination of a funding advocate. Highlight the variety of individual factors which must be considered in developing a funding strategy. Emphasize that cost should never preclude the selection of the most appropriate system. Emphasize that the advocate must explore all possible options, and based on an understanding of these resources, develop a plan of prioritization.		
Step 3: Applying to Funding Sources — Review the strategies on Transparency G-T8, *Useful Strategies When Applying for Funding*	Transparency (G-T8) *Useful Strategies When Applying for Funding*	
Review Transparency G-T9, *Supportive Documents for Funding Requests.* If time permits, share sample letter of necessity (G-H23).	Transparency (G-T9) *Supportive Documents for Funding Requests* Optional Handout (G-H23) *Sample Letter*	
Using Transparency G-T10, *Medical Programs,* review these sources and emphasize that medical programs are always the first source to explore. Highlight	Transparency (G-T10) *Medical Programs*	

LEVEL: GENERAL *(continued)*

GOAL: **#6** Gain practical information regarding obtaining funding for assistive technology devices and services.

COMPETENCY TYPE: KNOWLEDGE *(continued)*

OBJECTIVE: Participants will become familiar with a four-step process to seeking and obtaining funding, several primary sources of funding, and key strategies.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
the two key ingredients regarding the idea of speech prothesis and the need to communicate medical needs. Emphasize that while medical claims may be denied, the appeals process is available for further pursual.	Transparency (G-T11) *State and Government Agencies*	
Next, using Transparency G-T11, *State and Government Agencies,* review pertinent ones. Emphasize that these agencies may also be important channels to pursue if the individual meets given criteria, based on family income level, specific diagnosis, type of services needed, etc. Point out that many of the agencies listed in the booklet may not be appropriate for young children. Point out that BVR will be an important resource in later years when vocational goals may be used to support requests for funding.		
In reviewing the *public schools' responsibility,* emphasize that the school may be responsible for providing assistive technology if the IEP team determines it to be necessary in order for a particular child to receive a "free appropriate public education."		Further elaboration of the public schools' responsibility for provision of assistive technology devices and services can be found in the Administrative section of Goal 6.

LEVEL: GENERAL *(continued)*

GOAL: **#6** Gain practical information regarding obtaining funding for assistive technology devices and services.

COMPETENCY TYPE: KNOWLEDGE *(continued)*

OBJECTIVE: Participants will become familiar with a four-step process to seeking and obtaining funding, several primary sources of funding, and key strategies.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
Point out the major disadvantage: the child usually does not have access to the device outside of classroom time, and looses access to it should he/she move out of that particular district.		
Point out that *Trust Funds, Foundations, and Corporations* (Transparency G-T12) is the next source for pursual. While some research is necessary, many advocates have been pleasantly surprised to find large sums of money available for the asking.	Transparency (G-T12) *Trust Funds, Foundations, and Corporations*	
With Transparency G-T13, point out that *Nonprofit and Service Groups* should be the next on the list for pursual. Emphasize that these organizations are often excellent sources of information regarding other sources of available funding. Point out how these groups may be challenged to match contributions from other sources.	Transparency (G-T13) *Nonprofit and Service Groups*	
With Transparency G-T14, review *fund-raisers, wish-makers, and public appeal,* emphasizing that public appeal should be considered only after all other sources have been exhausted.	Transparency (G-T14) *Fundraisers, Wish-Makers, and Public Appeal*	

LEVEL: GENERAL *(continued)*

GOAL: **#6** Gain practical information regarding obtaining funding for assistive technology devices and services.

COMPETENCY TYPE: KNOWLEDGE *(continued)*

OBJECTIVE: Participants will become familiar with a four-step process to seeking and obtaining funding, several primary sources of funding, and key strategies.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
Step 4: Follow-Up — Returning to Transparency G-T7, present follow-up as a critically important step in the (ongoing) process. This may involve evaluating how well the proposed solution is helping to solve the original problem, ensuring that training for the student and adults is taking place, making necessary modifications to equipment and/or its use, and ensuring that its use is being integrated within all areas of the students functioning.	Transparency (G-T7) *Four Steps to Funding*	
2. Summarize by presenting Transparency G-T15, *Funding Steps.* Give participants Handouts G-H24, 25, and 26 for their future reference.	2. Transparency (G-T15) *Funding Steps* Handout (G-H24, 25, and 26) *Funding* [illegible] *Funding Devices and Services in Augmentative and Alternative Communication* *Funding Agencies and Resources*	

FOUR STEPS TO FUNDING

Step One:
ASSESSMENT

Step Two:
FUNDING ADVOCATE
and
DEVELOPING STRATEGIES

Step three:
APPLYING TO SOURCES

Step four:
FOLLOW-UP

FUNDING IN OHIO

Bureau for Children with Medical Handicaps
246 N. High St.
P.O. Box 1603
Columbus, OH 43266

For information contact:
General Information
614/466-1700

Description:
Bureau for children with Medical Handicaps provides diagnostic and treatment services to children from birth to 21 years of age with physical handicaps or certain chronic illnesses.

Eligibility Criteria:
Diagnostic services are available to children up to their 21st birthday with no financial eligibility. Treatment services are provided based on medical diagnosis, and family income.

Principal Disabilities Served

☐ ALS
■ Amputation
■ Blind
■ Cerebral Palsy
■ Deaf
☐ Mental Retardation
☐ Multiple Sclerosis
☐ Muscular Dystrophy
☐ Musculo-Skeletal Injury
☐ Other Neuromuscular Diseases
■ Spina Bifida
■ Spinal Cord Injury
■ Traumatic Head Injury
■ Other
☐ All of the Above

Principal Technology Services Funded

☐ Information
☐ Referral
■ Assessment
☐ Recommendations
☐ Ordering
☐ Fitting
■ Fabrication
■ Evaluation
☐ Training
■ Maintenance/Repair
■ Follow-Up
■ Equipment (see below)
☐ Other

Primary Areas of Equipment Funded

☐ Aids for Daily Living
■ Augmentative Communication
☐ Computer Applications
☐ Environmental Control Systems
☐ Home/Worksite Modifications
■ Prosthetics and Orthotics
☐ Seating and Positioning
■ Aids for Vision/Hearing Impaired
■ Wheelchairs/Mobility Aids
☐ Vehicle Modifications
☐ Other

Services and/or Equipment Typically Not Funded:
Environmental modifications: education related items; vehicle modifications, historically does not fund electric wheelchairs.

Helpful Hints:
BCMH is part of the Maternal and Child Health Department of the Health Department of Ohio. The usual way families become involved with BCMH is through the hospital providing services. Families may also contact their local health department or BCMH directly. All diagnostic and treatment services must be through an approved provider.

Ohio Department of Education
Division of Special Education
933 High Street
Worthington, OH 43085-4087

For information contact:
Local School District
Special Education Coordinator

Description:
State law requires local educational agencies to provide appropriate educational programs for all identified handicapped pupils from age five (5) to twenty-one (21). Public Law 99-457, Section 619 has required that a plan be developed for serving three- to five-year-old identified handicapped children in the 91-92 school year.

Eligibility Criteria:
Any handicapped child who has been placed in special education programs in accordance with relevant federal and state regulations is eligible to benefit from funding. Each student must have an IEP (Individual Education Program). There are other specifics and financial guidelines to meet in the approved requirements. State categories are: Hearing Handicapped, Visually Handicapped, Orthopedically Handicapped, Other Health Handicapped, Severe Behavior Handicapped, Developmentally Handicapped, and Specific Learning Disabled.

Principal Disabilities Served

☐ ALS
☐ Amputation
☐ Blind
☐ Cerebral Palsy
☐ Deaf
☐ Mental Retardation
☐ Multiple Sclerosis
☐ Muscular Dystrophy
☐ Musculo-Skeletal Injury
☐ Other Neuromuscular Diseases
☐ Spina Bifida
☐ Spinal Cord Injury
☐ Traumatic Head Injury
☐ Other
■ All of the Above

Principal Technology Services Funded

☐ Information
☐ Referral
■ Assessment
☐ Recommendations
☐ Ordering
■ Fitting
☐ Fabrication
■ Evaluation
■ Training
☐ Maintenance/Repair
☐ Follow-Up
■ Equipment (see below)
☐ Other

Primary Areas of Equipment Funded

☐ Aids for Daily Living
■ Augmentative Communication
■ Computer Applications
☐ Environmental Control Systems
☐ Home/Worksite Modifications
☐ Prosthetics and Orthotics
■ Seating and Positioning
■ Aids for Vision/Hearing Impaired
■ Mobility Aids
☐ Vehicle Modifications
☐ Other

Services and/or Equipment Typically Not Funded:
This Office is responsible only for providing funding to school systems through state and federal sources. Request for funding must be educationally relevant and necessary for a student to implement his or her IEP.

Helpful Hints:
A child must be classified as a Special Education Student before he or she is eligible to benefit from education of the handicapped funding. An IEP must be written that recommends technology services and/or equipment that is educationally relevant. All equipment becomes school district property. Contact the District Coordinator of Special Education in your local school district for more specific information.

(See Integrating Technology into a Student's IEP in the Appendix.)

Ohio Department of Mental Retardation/Developmental Disabilities
Family Resources Services Program
1821 Summit Road, #G30
Cincinnati, OH 45237

For information contact:
FRSP Coordinator
513/821-2128

Description:
Family Resources Services Program is a program aimed at assisting families who care for a family member who has mental retardation or a substantial developmental disability in their home. The program promotes the unity of the family by reimbursing them for all or part of the expenditures incurred in meeting the special needs of a person with mental retardation or other substantial developmental disability, expenditures that would promote self-sufficiency and normalization or prevent or reduce inappropriate institutionalization. Services provided on a sliding fee scale basis.

Eligibility Criteria:
A family is eligible for the Family Resources Program if a family member has mental retardation or other developmental disability, the family member with mental retardation or other developmental disability resides in the home and is in need of habilitation services, the family resides in the county in which reimbursement is sought and the individuals in the home comprise a family as defined by the program. There is a Family Resources Services Program in each county.

Principal Disabilities Served

☐ ALS
☐ Amputation
☐ Blind
☐ Cerebral Palsy
☐ Deaf
■ Mental Retardation
☐ Multiple Sclerosis
☐ Muscular Dystrophy
☐ Musculo-Skeletal Injury
☐ Other Neuromuscular Diseases
☐ Spina Bifida
☐ Spinal Cord Injury
☐ Traumatic Head Injury
■ Other (DD)
☐ All of the Above

Principal Technology Services Funded

☐ Information
☐ Referral
☐ Assessment
☐ Recommendations
☐ Ordering
☐ Fitting
☐ Fabrication
☐ Evaluation
■ Training
☐ Maintenance/Repair
☐ Follow-Up
■ Equipment (see below)
■ Other

Primary Areas of Equipment Funded

■ Aids for Daily Living
■ Augmentative Communication
☐ Computer Applications
■ Environmental Control Systems
■ Home/Worksite Modifications
■ Prosthetics and Orthotics
■ Seating and Positioning
■ Aids for Vision/Hearing Impaired
■ Wheelchairs/Mobility Aids
■ Vehicle Modifications
☐ Other

Services and/or Equipment Typically Not Funded:
Microcomputers which are not part of a communication device, or direct services to the handicapped family member.

Helpful Hints:
Families initial contact should be to the local County Board. Services are provided through approved providers.

Ohio Medicaid
Department of Human Services
317 E. 7th Street
Cincinnati, OH 45202

For information contact:
Rosemary Walton
614/466-8545

Description:
The Medicaid program is designed to provide quality health care to persons of low income defined as categorically and medically needy. The Medicaid program is sometimes called Title XIX because it is authorized by Title XIX of the Social Security Act. The Department of Human Services is designated as the single state agency to administer the program. The county offices of the Welfare Department determine eligibility for Medicaid.

Eligibility Criteria:
A disabled person who receives SSI or Social Security payments, Aid to Dependent Children, is eligible for the Healthy Start Program. Anyone who is legally blind or over 65 and meets financial eligibility is eligible for Medicaid. In addition, anyone eligible for general assistance or certain waiver programs is also eligible for Medicaid.

Principal Disabilities Served

- ☐ ALS
- ☐ Amputation
- ☐ Blind
- ☐ Cerebral Palsy
- ☐ Deaf
- ☐ Mental Retardation
- ☐ Multiple Sclerosis
- ☐ Muscular Dystrophy
- ☐ Musculo-Skeletal Injury
- ☐ Other Neuromuscular Diseases
- ☐ Spina Bifida
- ☐ Spinal Cord Injury
- ☐ Traumatic Head Injury
- ☐ Other
- ■ All of the Above

Principal Technology Services Funded

- ■ Information
- ■ Referral
- ■ Assessment
- ■ Recommendations
- ☐ Ordering
- ☐ Fitting
- ■ Fabrication
- ■ Evaluation
- ■ Training
- ■ Maintenance/Repair
- ☐ Follow-Up
- ■ Equipment (see below)
- ☐ Other

Primary Areas of Equipment Funded

- ■ Aids for Daily Living
- ☐ Augmentative Communication
- ☐ Computer Applications
- ☐ Environmental Control Systems
- ☐ Home/Worksite Modifications
- ■ Prosthetics and Orthotics
- ☐ Seating and Positioning
- ■ Aids for Vision/Hearing Impaired
- ■ Wheelchairs/Mobility Aids
- ☐ Vehicle Modifications
- ■ Other

Services and/or Equipment Typically Not Funded:

Helpful Hints:
Durable medical equipment and services must be for use by the individual in their residence, must be medically necessary, and must have been prescribed by a physician. Product literature and letters of support can help the application. The equipment must be reasonable and necessary for diagnosis or treatment of an illness or injury or improve the function of a malformed body member. Orthotic appliances are those items employed for correction or prevention of skeletal deformities. Prosthetic devices replace all or part of the function of a permanently inoperative or malfunctioning body organ. The individual's illness or injury must be considered in resolving coverage issues in each case. The Omnibus Budget Reconciliation Act also adds "other health care needs". Historically this has not included communication devices or computers, but they are *not* specifically excluded either.

Ohio Medicare
Social Security Administration
550 Main Street
Cincinnati, OH 45202

For information contact:
1-800-234-5772

Description:
Medicare is a hospital and medical insurance program administered by the Social Security Administration for covered persons who are either 65 years of age or older, or who are (at any age) blind, totally and permanently disabled, and have been receiving Social Security disability payments for 24 months, or have end-stage renal disease.

Eligibility Criteria:
Medicare has two parts: Part A (Hospital Insurance) pays the expenses of an individual in a hospital, skilled nursing facility or at home when receiving services provided by a home health agency. Part B (Medical Insurance) helps pay for physician services, outpatient hospital services, medical services and supplies, outpatient physical therapy and other health care services. Many Medicare recipients are also eligible for Medicaid benefits. Medicaid pays the Part B insurance premiums plus the coinsurance and deductible amounts and other charges sponsored by Medicaid but not covered by Medicare. In cases of crossover, Medicare regulations apply.

Principal Disabilities Served

☐ ALS
☐ Amputation
☐ Blind
☐ Cerebral Palsy
☐ Deaf
☐ Mental Retardation
☐ Multiple Sclerosis
☐ Muscular Dystrophy
☐ Musculo-Skeletal Injury
☐ Other Neuromuscular Diseases
☐ Spina Bifida
☐ Spinal Cord Injury
☐ Traumatic Head Injury
☐ Other
■ All of the Above

Principal Technology Services Funded

☐ Information
☐ Referral
☐ Assessment
☐ Recommendations
☐ Ordering
☐ Fitting
☐ Fabrication
☐ Evaluation
☐ Training
☐ Maintenance/Repair
☐ Follow-Up
■ Equipment (see below)
☐ Other

Primary Areas of Equipment Funded

☐ Aids for Daily Living
☐ Augmentative Communication
☐ Computer Applications
☐ Environmental Control Systems
☐ Home/Worksite Modifications
■ Prosthetics and Orthotics
■ Seating and Positioning
☐ Aids for Vision/Hearing Impaired
■ Wheelchairs/Mobility Aids
☐ Vehicle Modifications
☐ Other

Services and/or Equipment Typically Not Funded:
Bathroom and toileting aids; vehicle modifications.

Helpful Hints:
Medicare limits payments to certain "covered services" deemed medically necessary based on Medicare regulations. Durable medical equipment and services must be for use by the individual in their residence, must be medically necessary, and must have been prescribed by a physician. The equipment must be reasonable and necessary for diagnosis or treatment of an illness or injury or improve the function of a malformed body member. The publication "Durable Medical Equipment-Screening List, Medicare Coverage Issues Manual HCFA-Pub 6" should be requested. If equipment is rented under Medicare, the dealer will monitor the equipment and provide service during the rental period.

Private Health Insurance Companies
Contact your individual insurance agent or group coverage representative.

For information contact:
Your agent, personnel benefits manager, or case manager (ask if your company uses case management).

Description:
Private insurance companies fund certain types of equipment, depending on the terms of the policy and the specific medical condition involved. Most policies fund durable medical equipment such as wheelchairs, braces, etc.

Eligibility Criteria:
Rehabilitation services are not specifically addressed in most policies, therefore each policy will differ. Some policies do not cover "pre-existing" conditions, but do cover accidental injuries or conditions which manifested after coverage began. Policies which cover only the hospital stay will usually fund devices if prescribed by a physician when the individual is in the hospital. Unless the policy specifically states that it will not pay for a specific aid or device, the individual should file a claim. If the equipment is necessary but does not fall within guidelines of the policy, the individual can ask to revise the policy or make exceptions to the rule. All denied claims should be resubmitted and appealed.

Principal Disabilities Served

- ☐ ALS
- ☐ Amputation
- ☐ Blind
- ☐ Cerebral Palsy
- ☐ Deaf
- ☐ Mental Retardation
- ☐ Multiple Sclerosis
- ☐ Muscular Dystrophy
- ☐ Musculo-Skeletal Injury
- ☐ Other Neuromuscular Diseases
- ☐ Spina Bifida
- ☐ Spinal Cord Injury
- ☐ Traumatic Head Injury
- ☐ Other
- ■ All of the Above

Principal Technology Services Funded

- ☐ Information
- ☐ Referral
- ☐ Assessment
- ☐ Recommendations
- ☐ Ordering
- ☐ Fitting
- ☐ Fabrication
- ☐ Evaluation
- ☐ Training
- ☐ Maintenance/Repair
- ☐ Follow-Up
- ■ Equipment (see below)
- ☐ Other

Primary Areas of Equipment Funded

- ■ Aids for Daily Living
- ☐ Augmentative Communication
- ☐ Computer Applications
- ☐ Environmental Control Systems
- ☐ Home/Worksite Modifications
- ■ Prosthetics and Orthotics
- ■ Seating and Positioning
- ☐ Aids for Vision/Hearing Impaired
- ■ Wheelchairs/Mobility Aids
- ☐ Vehicle Modifications
- ☐ Other

Services and/or Equipment Typically Not Funded:
Hearing aids, corrective lenses.

Helpful Hints:
Insurance companies should be approached before seeking out other sources of funding, even if chances are slim. Other funding sources may require a rejection from the insurance company. When submitting a request for insurance payment of equipment, the nature of the request may determine the outcome of the decision. Determinations are based on need, prognosis, diagnosis, and type of equipment. Information should include length of time the device will be used, projected improvement in quality of life, and increased independence. Terminology in the written recommendation is an important factor; for example, the wording "prescription as treatment of..." or "for problems resulting from..." the specific diagnosis or injury can be helpful. The recommendation should include brand names, model, price, product literature, and supporting letters from associated health professionals. (From the PAM Repeater, No. 42, September 1987.)

Ohio Rehabilitation Services Commission
Vocational Rehabilitation Department
Enquirer Bldg., Suite 925
617 Vine Street
Cincinnati, OH 45202

For information contact:
513/852-3223

Description:
The 1986 Amendments to the 1973 Rehabilitation Act authorizes the provision of rehabilitation engineering/technology services to eligible individuals receiving vocational rehabilitation services.

Eligibility Criteria:
There must be a determination of a disabling condition (not visual impairment) and the handicapping condition must pose a significant obstacle to vocational/independent living functions and there must be a reasonable expectation that the services can assist the person to achieve gainful employment or function significantly more independently in the community.

Principal Disabilities Served

☐ ALS
☐ Amputation
☐ Blind
☐ Cerebral Palsy
☐ Deaf
☐ Mental Retardation
☐ Multiple Sclerosis
☐ Muscular Dystrophy
☐ Musculo-Skeletal Injury
☐ Other Neuromuscular Diseases
☐ Spina Bifida
☐ Spinal Cord Injury
☐ Traumatic Head Injury
☐ Other
■ All of the Above

Principal Technology Services Funded

■ Information
■ Referral
■ Assessment
■ Recommendations
■ Ordering
■ Fitting
■ Fabrication
■ Evaluation
■ Training
☐ Maintenance/Repair
☐ Follow-Up
■ Equipment (see below)
☐ Other

Primary Areas of Equipment Funded

■ Aids for Daily Living
■ Augmentative Communication
■ Computer Applications
■ Environmental Control Systems
■ Home/Worksite Modifications
■ Prosthetics and Orthotics
■ Seating and Positioning
■ Aids for Vision/Hearing Impaired
■ Wheelchairs/Mobility Aids
■ Vehicle Modifications
☐ Other

Services and/or Equipment Typically Not Funded:
Each case is evaluated on an individual basis.

Helpful Hints:
An individual should first contact their local VR area office. A counselor has to evaluate the individual and declare the individual eligible for VR services prior to completing an IWRP (Individualized Written Rehabilitation Program) recommending rehabilitation engineering services. These services include home accessibility, job modification, and health maintenance. Job modifications are expected to be cost-shared with the employer. VR uses an economy needs test in determining all case service expenditures. VR also administers Independent Living funds which, in some cases, can be used to purchase equipment.

To begin the process, write to the bureau including name, address, phone number, and disabling condition. This office serves Hamilton, Butler, Clinton, Clermont, and Warren counties. They can refer you to the appropriate office if you are outside these counties. Due to lack of monies, a person may be eligible for services, but not receive services because of a current directive to serve the severely disabled. In the Cincinnati area, Independent Living Options works with BSVI to provide Title 7, Part A monies for communication devices, computers, etc., BSVI eligibility is necessary.

Independent Living Services
Enquirer Bldg., Suite 905
617 Vine Street
Cincinnati, OH 45202

For information contact:
Gary Johnson, Liaison
513/852-3223

Principal Disabilities Served

☐ ALS
☐ Amputation
☐ Blind
☐ Cerebral Palsy
☐ Deaf
☐ Mental Retardation
☐ Multiple Sclerosis
☐ Muscular Dystrophy
☐ Musculo-Skeletal Injury
☐ Other Neuromuscular Diseases
☐ Spina Bifida
☐ Spinal Cord Injury
☐ Traumatic Head Injury
☐ Other
■ All of the Above

Principal Technology Services Funded

■ Information
■ Referral
■ Assessment
■ Recommendations
■ Ordering
■ Fitting
■ Fabrication
■ Evaluation
■ Training
☐ Maintenance/Repair
■ Follow-Up
■ Equipment (see below)
☐ Other

Primary Areas of Equipment Funded

■ Aids for Daily Living
■ Augmentative Communication
■ Computer Applications
■ Environmental Control Systems
■ Home/Worksite Modifications
■ Prosthetics and Orthotics
■ Seating and Positioning
■ Aids for Vision/Hearing Impaired
■ Wheelchairs/Mobility Aids
■ Vehicle Modifications
☐ Other

Ohio Rehabilitation Services Commission
Bureau of Services for the Visually Impaired
Enquirer Bldg., Suite 905
617 Vine Street
Cincinnati, OH 45202

For information contact:
513/852-3223

Description:
The 1986 Amendments to the 1973 Rehabilitation Act authorizes the provision of rehabilitation engineering/technology services to eligible individuals receiving vocational rehabilitation services.

Eligibility Criteria:
There must be a determination of a visual impairment which is the primary handicap. The handicapping conditions must pose a significant obstacle to vocational/independent living function, and there must be a reasonable expectation that the services can assist the person to achieve gainful employment or function significantly more independently in the community.

Principal Disabilities Served

☐ ALS
☐ Amputation
■ Blind
☐ Cerebral Palsy
☐ Deaf
☐ Mental Retardation
☐ Multiple Sclerosis
☐ Muscular Dystrophy
☐ Musculo-Skeletal Injury
☐ Other Neuromuscular Diseases
☐ Spina Bifida
☐ Spinal Cord Injury
☐ Traumatic Head Injury
☐ Other
☐ All of the Above

Principal Technology Services Funded

■ Information
■ Referral
■ Assessment
■ Recommendations
■ Ordering
■ Fitting
■ Fabrication
■ Evaluation
■ Training
☐ Maintenance/Repair
☐ Follow-Up
■ Equipment (see below)
☐ Other

Primary Areas of Equipment Funded

■ Aids for Daily Living
■ Augmentative Communication
■ Computer Applications
☐ Environmental Control Systems
■ Home/Worksite Modifications
■ Prosthetics and Orthotics
■ Seating and Positioning
■ Aids for Vision Impaired
■ Wheelchairs/Mobility Aids
■ Vehicle Modifications
☐ Other

Services and/or Equipment Typically Not Funded:
Each case is evaluated on an individual basis.

Source: SpeciaLink (1990). *Alternative and Assistive Funding of Alternative and Assistive Technology in Ohio: A Guide.*

USEFUL STRATEGIES WHEN APPLYING FOR FUNDING

1. Develop an understanding of the primary funding source and its relationship to other potential sources.
2. Maintain regular contact with the potential source. Direct calls and letters to the same person.
3. Communicate in writing whenever possible. Maintain a log of all contacts and information.
4. Review all policies and try your best to fully understand the policies and guidelines of the potential funding source.
5. Learn to use the language of the source. Provide substantial documentation from multiple sources of your need.
6. When questioned, try to educate and inform, emphasizing the long-term benefits to both the client and the source.
7. Provide all necessary documentation and be ready to appeal your request if denied.
8. Move on to secondary source(s) when efforts fail to bring success within appropriate timelines.

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SUPPORTIVE DOCUMENTS FOR FUNDING REQUESTS

Physician's prescription

Letter of necessity from
  physician
  speech/language pathologist
  physical therapist
  occupational therapist
  teacher
  parents
  nurse
  rehabilitation counselor
  rehabilitation engineer

Insurance claim form

Photograph of the individual

General discussion of medical diagnosis

Literature describing the requested devices with specifications as they pertain to the individual

Explanation of the individual's functional skills without the equipment and how improved with the technology

Augmentative communication evaluation results including documentation that current methods are not sufficient for communication

Documentation of sources for additional support

OUTLINES FOR LETTERS OF MEDICAL NECESSITY

Physician's letter:

1. Medical History and Diagnosis
2. Prognosis
   a. Overall
   b. For speech
3. Degree of difficulty physician has in communicating with client
   a. Specific examples
4. Prescribed communication device or 'speech prosthesis'
   a. Why appropriate for medical purposes?
5. Additional supportive comments
   a. If the physician has seen the client use the device, comments regarding the client's effectiveness with the device should be included.

Speech Language Pathologist's letter:

1. Medical History and Diagnosis
2. Attempts at achieving verbal communication
   a. How long has client been in therapy
   b. Methods used to encourage verbal communication
3. Prognosis for speech
4. Client's present means of communication
   a. Why it is inappropriate/insufficient for medical purposes
5. Alternatives to present means of communication which have been investigated
   a. What they are
   b. Why they are not appropriate
6. Prescribed device
   a. Why more appropriate than above
7. Detailed description of client's trial period with prescribed device, if applicable.

A possible sentence for inclusion in the Speech/Language Pathologist's letter is:

> "Following extensive evaluation with this client, it is my professional opinion that the Touch (Light) Talker with Minspeak is the least expensive device which will adequately serve the communication needs of (client)."

Occupational Therapist's and Physical Therapist's letters

1. Medical History and Diagnosis
2. Length of treatment
3. How does lack of verbal communication hinder therapy?
4. Document (if applicable) client's inability to use manual communication
5. How would verbal communication allow client to receive maximum benefit from therapy?
6. Additional supportive comments:
   a. If the therapist has seen the client use the device, comments about the client's effective use of the device should be included.

Parent's letter:

1. Medical History and Diagnosis
2. Prognosis for speech
3. Describe specific medical situations in which your child's medical needs were not attended to within reasonable amounts of time due to communication barriers between the client and primary care givers (parents, physician, nurses, etc.).

(*See Medical Necessity sheet for more ideas.)

Teacher's letter:

1. Medical history and diagnosis
2. Length of time you have provided services
3. Describe specific situations, if appropriate, in which the client was ill or not feeling well and how this was handled within your classroom. Many teachers have reported incidents in which the client was ill and they interpreted it as "the client was having a bad day."
4. How would verbal communication allow this client to receive more timely medical care?
5. Additional supportive comments:
   a. If you have seen the client using the above device, comments regarding its effectiveness should be included.
   b. Provide comments regarding the client's ability to physically access the device.

SAMPLE

The Child Health Center
89 MAIN STREET / NORWAY MAINE 04268 / (207) 743-7034

December 4, 1987

To Whom It May Concern

Re: (d.o.b.)

Dear Sirs:

I am writing in my role as the personal physician for , now 4½ years old. has been a patient of mine since his birth. His medical diagnoses include severe spastic quadraparesis secondary to perinatal asphyxia. I am writing at this time to express my strong support for his obtaining an augmentive communication device. 's severe cerebral palsy makes it impossible for him to communicate through normal vocalization, and this will continue to be the case in the future. Obviously, there are many reasons why he needs to have some way to communicate with the outside world. There is ample evidence that he possesses the cognitive abilities to communicate but because of the cerebral palsy lacks the physical ability to talk. From a medical point of view, it is exceedingly difficult to manage him without any way to have direct communication with him. He has no way that he can communicate a report of his symptoms or concerns, and that hampers my ability to manage him medically. Because of his severe neurologic problems, he is at some medical risk for sudden problems, and I am fearful that without any means of communication that these problems could not be recognized in a timely fashion. Furthermore, those working with to improve his physical functions, such as physical therapists, are not able to work at maximal benefit because of the communication limitations.

In sum, the modern medical management of severe cerebral palsy is generally considered to include augmentative communication assistance as an integral part of a program. I strongly urge that funding of such a device be covered under his insurance policy for the above-noted reasons. If you have any questions please feel free to contact me.

Sincerely,

Stephen F. Bauer, M.D.

SFB:rm

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SAMPLE

Androscoggin Home Health Services Inc.
79 Main Street, P.O. Box 400
Auburn, Maine 04210
(207) 784-9304
Toll Free 1-800-482-7412

Main Street
rmington, Maine 04938
lephone 778-3523

Vinter Street
rway, Maine 04268
lephone 743-7301

1 Knox Street
ımford, Maine 04276
lephone 364-2723

November 30, 1987

RE:
DOB:

Dear Sirs:

is a four year nine month old boy who has athetoid cerebral palsy with severe spasticity involving all four extremities. He is non-verbal and unable to communicate his medical and emotional needs.

I have worked with for the past three years in the home environment; speech and language therapy has emphasized developing a method to help express his basic needs. is limited in his expression due to his lack of verbalizations. Initially,he was taught to communicate his needs via eye gaze; however, this limited him to objects and places in his immediate environment. His pointing skills have improved in the past few months; therefore, his non-verbal expressive vocabulary has increased but is limited to the few pictures that he is able to point to on his tray.

The Touch Talker is the most effective speech prosthesis for He was evaluated at Maine Medical Center, Portland, Maine on 02/06/87 and this instrument was recommended as "the most efficient encoded symbol system." Subsequently, the Touch Talker was rented from Prentke Romich Inc. for a two-week period to determine whether or not this system was appropriate for He easily learned the encoded symbol system and the smiles and laughs that he expressed revealed an understanding that at last he was beginning to establish some independence in his environment. He seemed delighted by the synthesized speech that he was able to activate by pointing to a specific symbol. Since he is incapable of physiologically producing speech, this was the first time that he was able to elicit meaningful verbalizations. He was able to express to his parents when he was hungry or thirsty. Instead of crying, and the parents having to guess what was upsetting their son, he was able to express in a meaningful way what it was that he wanted or needed. cried when The Touch Talker was taken away from him and he was told that it had to be returned.

receptive language abilities and cognition are close to or at chronological age level. His problem, specific to speech and language needs, is his lack of meaningful expressive language skills. understands what he feels but is unable to express his physical and emotional needs.

(Con'd)

"A United Way Agency"

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This has caused extreme frustration evidenced by temper tantrums, crying, and whining. Several times during our therapy sessions right hand would become caught underneath his lap tray. At first a look of pain would appear on face. If I was unable to guess the cause he would then start to cry since the pain was most likely increasing. would then start screaming until finally, after a process of elimination, I was able to determine the cause of his pain. With The Touch Talker he would be able to immediately express the problem without increased pain or stress.

Due to lack of verbal expression potty-training has been unsuccessful. He has been unable to communicate when he has to go or has already gone in his diapers. His crying indicated discomfort but, again, this problem could not be solved until his parents or therapist were able to determine the cause. Once again, due to lack of verbal communication, his was unable to express his discomfort or distress.

therapeutic team not only feels that The Touch Talker is the most efficient speech prosthesis for him but, since it is one that will grow with through various programming methods as his medical and emotional needs expand, another electronic communicator devise would not be required. Therefore, the insurance company would not be requested to fund another speech prosthesis as he grows emotionally.

Thank you for your consideration of The Touch Talker and helping become an independent person with the ability to express medical and emotional needs.

Lynne Williams Garrow, MACCC SLP

Lynne Williams Garrow
MA CCC-SLP

LWG/ddw

MEDICAL PROGRAMS

Private Payment

Private Health Insurance

Federal/State Health Care Programs

- Medicaid
- Medicare
- Bureau for Children with Medical Handicaps

STATE AND GOVERNMENT AGENCIES

Ohio Rehabilitation Services Commission

Bureau of Services for Visually Impaired

Ohio Department of Mental Retardation/Developmental Disabilities

Ohio Department of Education, Division of Special Education

Ohio Department of Human Services, Bureau of Medicaid Policy

Governor's Office of Advocacy

Ohio Department of Education, Division of Early Childhood

TRUST FUNDS, FOUNDATIONS, AND CORPORATIONS

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NONPROFIT AND SERVICE GROUPS

Kiwanis

Rotary

Telephone Pioneers

Lions

Quota Club

Sertoma

United Cerebral Palsy

Easter Seal Society

Muscular Dystrophy Association

Churches/Synagogues

United Way

March of Dimes

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FUNDRAISERS

WISH MAKERS

Percy Ross
Sunshine Foundation
Make-a-Wish Foundation

PUBLIC APPEAL

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FUNDING STEPS

- Obtain a technology evaluation for your child
- Locate a funding advocate
- Start with primary funding sources
- Gather supportive materials
- Document all originals, steps, and contacts
- Submit your request — use appropriate jargon
- Set time limit
- Appeal if necessary
- Be patient!!

Source: Preschool Integration Through Technology Systems, (PITTS), United Cerebral Palsy Association of Western New York, Inc., 4635 Union Rd., Buffalo, NY 14225; US DOE Grant #H024E80010

FUNDING

Recent data have shown that the most critical component of the funding process is the FUNDING ADVOCATE. The funding advocate can be a family member, case manager, educator, friend, or anyone who is willing to invest time in procuring funding for an individual's assistive device. Persistence and dedication are important qualities for the funding advocate as the process can be lengthy. Guidance from a resource person who is familiar with the funding process is extremely helpful and can be located by contacting your local medical or educational agency or the manufacturer or sales representative for the system/device.

The first source of funding to explore is Medical Coverage. This category would include private payment, private health insurance, and federal/state health care programs (Medicaid, Medicare, or the Bureau of Medical Handicaps). Requests based on medically-related needs should reference speech prosthesis and inability to communicate critical medical information. An appeal process generally follows if a denial for prior approval occurs. Clarification of information or additional information may be needed for the appeal. A resource person familiar with the funding process would be helpful in providing suggestions throughout this procedure. As of this date, Medicare has funded few communication devices. Organizations are lobbying to make changes in the Medicaid regulations. At this time, long term care facility residents have a better chance to get funding through Medicaid than other applicants. Please refer to the resources listed on the last page of this section.

Funding through Educational Agencies, Schools, and Vocational Rehabilitation Programs can be researched if appropriate during the processing of the insurance claim. State/federal programs would include, but are not limited to, the following: State Department of Mental Retardation/Developmentally Disabled, Bureau for Children with Medical Handicaps, Rehabilitation Services Commission (BVR), Veteran's Administration, and Worker's Compensation. The school can be contacted for assistance with educationally related issues for individuals age birth through 22 living within their school district boundaries. Schools have purchased devices for students, but this does not provide for flexibility since it belongs to the school system and is often not available for their personal use. Schools may require that the device stay in the school and would prevent communication in other critical settings. If the child moves out of the district or graduates, the device must stay with the school system.

Trust funds, foundations, and private corporations would be next on the list to contact as a funding source. Some trust funds and foundations designate money for specific or general purposes with guidelines for application. Directories can be found in libraries. Banks often have foundations and have this information available in the trust division of the main bank office. Large, national foundations receive many requests for funding, although small, local foundations may not be utilized because people are not aware of their existence. Local businesses/private corporations can be another source of funding as the company can use the contribution as a tax write-off or for public relations to boost their image.

The next source to pursue would be Nonprofit Civic Organizations/Service Clubs such as Kiwanis, Rotary, Lions, etc. These clubs have often contributed to the purchase of equipment, although they often offer to match contributions from other sources. Service Organizations such as United Cerebral Palsy (UCP), Easter Seal Society, Muscular Dystrophy Association, etc. tend to provide services for groups of people rather than individuals, although some contributions have been made for individuals. These service organizations may also assist you in making some connections with other sources for funding. Local chapters can be found in your telephone directory.

Fundraisers are next on the list with groups willing to sponsor private or public fundraising activities such as dances, bake sales, candy/product sales, etc. Wishmakers are a few people and organizations across the country which grant wishes for people. Two major sources are Percy Ross, author of "The Millionaire" newspaper column that runs in papers across the country, and **The Sunshine Foundation** for children with chronic disabilities (4010 Levick Street, Philadelphia, PA 19135).

After all sources of funding have been exhausted, a public appeal may be attempted. The family may or may not want to be placed in this public forum with newspaper and television appeals as well as pictures and information in local establishments.

Remember, funding is always available with persistence and dedication by the funding advocate and a little help from those who have experienced the process.

Components of a Medically Based Request

Since a medical insurance request is typically the first step that individuals make in the funding process, the following guidelines are presented.

Review the insurance policy dealing with Durable Medical Equipment, Prosthetics, and Orthotics. Your requests can focus on the terminology that they use for approved equipment while steering away from terms which are stated as exclusions. Identify a contact person to whom all correspondence and questions should be directed.

Include the following materials: (More specific guidelines, sample letters and forms available from the listed resources)

1. Prescription from the physician
2. Letter of medical necessity from the physician
3. Letter of medical necessity from the speech/language pathologist
4. Insurance Claim form
5. Literature describing the requested device

Additional information that is optional but strongly recommended:

1. Letters of medical necessity from occupational therapist, physical therapist, nurse, parents
2. Photographs of the individual
3. Communication Prosthesis Payment review summary (1988 Specialized Product/Equipment Council) completed by the physician and speech/language pathologist
4. AAC Evaluation (including documentation that other methods of communication are not sufficient for communication)

When requesting that medical insurance provide funding, the main purpose of the device must be qualified for the medical request. Medical necessity must be clearly defined for medical insurance payment the same as would a request for accessing educational information to a school or for gainful employment to a vocational rehabilitation program. Two key ingredients in the medical requests are inclusion of the idea of speech prosthesis or replacing the function of a malfunctioning body part and the necessity of nonspeaking persons to be able to communicate critical medical needs to their physicians and primary caregivers. (Some policies, however, exclude the term "prosthesis.") Personal anecdotes regarding the latter are often effective.

Follow-Up Services

After a device is obtained, successful communication is dependent upon training of the family and school or vocational staff and the individual. It is often assumed that the individual can immediately use his/her system efficiently. Experience has proven that the provision of initial training and support is a necessary component of the entire process. Intensive therapy services through a speech/language pathologist, specialized clinic or educational agency to get the individual familiar with his/her system and able to communicate should be considered when the initial funding is requested. The assessment team should be able to provide assistance with the initial support needed or refer to appropriate sources. Support by linking up with other consumers and their families has also proven to be beneficial.

Funding Resources

Audiocassette: *Reimbursement Strategies for Assistive Devices* (audio teleconference held on August 23, 1989).

Funding for Assistive Technology and Related Services: An Annotated Bibliography, Alexander Enders, March, 1989, Electronic Industries Foundation, Rehabilitation Engineering Center, 1901 Pennsylvania Avenue, N.W., Suite 700, Washington, DC 20006.

How To Obtain Funding for Argumentative Communication Devices, 2/89. Prenke Romich Co., 1022 Heyl Road, Wooster, OH 44691, 800/262-1990 is helpline (free; contains sample letters).

Steps to Funding Ohio Augmentative Communication Problem Solving Consortium, May 1991.

The Many Faces of Funding, Anna C. Hoffman, Phonic Ear, 250 Camino Alto, Mill Valley, CA 94941, 415/383-4000 (sample letters).

Source: *Cuyahoga County Augmentative Communication Directory,* 1990.

FUNDING DEVICES AND SERVICES IN AUGMENTATIVE AND ALTERNATIVE COMMUNICATION

Communication is the essence of human life. Article II, Section 1, USSAAC Bylaws

Personal achievement is closely tied to the ability to communicate. The best interests of the client are being served only when the client is provided with the augmentative and alternative communication (AAC) device and services that offer the *most effective* communication possible. Because of the significant effect on a person's life, *this is no place for compromises based on cost or convenience*.

Fortunately, experience has shown that no such compromises are necessary. When a client has a good advocate, the funding can always be found for the best devices and services available.

FUNDING ADVOCATE

An early task in the funding procurement process is to identify the funding advocate. The fact that funding for a communication device is being sought suggests that the user is unable to speak for himself. Therefore, until the time that the user has an effective system and the skills to use it, an advocate must represent the interests of the user in many matters. *Funding will not happen without a dedicated advocate*.

THE USER

Qualify the user. What is the main purpose for the device? Is it considered a medical necessity, a tool for further education, or a means of gainful employment? To approach a school with the argument of medical necessity or to approach Medicaid with the argument that it will interface with a computer will not serve you well.

FUNDING SOURCES

There are many sources of funding for AAC devices and services and it is important to approach them in the proper order. Either Medicaid/ Insurance, the Schools, or the Vocational Rehabilitation agency should be tried first and all avenues within that source should be exhausted before trying one of the lower level options. Each source has its own procedures and policies. Before submitting an application for funding, familiarize yourself with them and do research to determine what has worked for others.

Funding for the Best is *Always* Available!

INSURANCE / MEDICAID

These are the sources to approach with a claim of medical necessity. A number of progressive insurance companies and state Medicaid programs already recognize communication aids as a medical necessity and fund them. There are still those, however, who have not yet responded to the opportunities available to people with disabilities as a result of new technologies. In some cases, it is because they have not been exposed to them. Use terms such as "speech prosthesis" which may position the device more familiarly. Bringing the user to the agency can be an effective means of educating them. Remember that denial is not an end point unless you let it be one. If you are denied, make it clear that you will appeal and eventually sue -- *and then do It!* This has been done with success, ultimately changing the system in those areas and paving the way for future clients.

SCHOOLS

Without a means of communication, it is difficult to participate in a normal academic setting. For that reason, schools have been known to purchase devices. Remember, however, that the device then belongs to the school, not the user. This may require the student to leave the device at school after school hours, during the summer, and permanently, after graduation or when moving out of the school system.

VOCATIONAL REHABILITATION PROGRAMS

Since employment is becoming a realistic goal for many people with disabilities, vocational rehabilitation programs will often fund augmentative communication devices if the main obstacle for employment is communication. Because these are also state-run programs, the eligibility requirements vary from state to state. Contact your local vocational rehabilitation office, which should be listed in the white pages of the phone book under your state's name.

PRIVATE CORPORATIONS

The purchase of equipment for a local resident by a business benefits both the user and business. The business will realize a tax write-off for a charitable contribution and will receive positive public relations (if the recipient agrees to publicity). This approach may be most effective with a company that *needs* a boost in its image.

TRUST FUNDS

Many people put part of their estate into a trust fund for a specific purpose. There may be one to assist people with disabilities in a bank in your area. Banks don't usually advertise this information however. To determine whether there are any such funds in your area, contact the trust division of each bank. Another source of information about funds is *The Foundation Directory* which lists funds and foundations. It can be found in large libraries. The larger foundations, such as the Ford Foundation, are typically inundated with requests, however, while local funds may sit untouched for years.

SERVICE CLUBS

Local civic organizations such as Kiwanis, Rotary, and Lions Clubs have often contributed to the purchase of equipment. Since funds are usually limited, it is best to use them sparingly and to suggest a "matching funds" arrangement with another funding source.

FUNDRAISERS

Families often have affiliations with groups which may assist in a fundraising activity. Churches, co-workers, and other organizations (such as labor unions) have successfully raised funds by conducting raffles, bake sales, car washes, dinners, and other creative activities.

"WISHMAKERS"

There are a handful of individuals and organizations which grant wishes to people with specific needs. Two such organizations are listed below. Your local UCPA affiliate may have more information.

- Percy Ross author of "*The Millionaire*" newspaper column which runs in papers across the country. Send him your request in care of a paper that carries the column.
- The Sunshine Foundation grants wishes to children with chronic disabilities. An application must be completed and there is a maximum amount they will fund. Families should contact the Sunshine Foundation National Headquarters, 4010 Levick St., Philadelphia, PA 19135.

PUBLIC APPEALS

If other sources of funding have been exhausted, a public appeal is an option. This form of funding procurement is not suggested as a regular avenue because people tend to become jaded if exposed to too many. Also, the family is placed directly in the public eye which may be uncomfortable. It has proved to be a successful tactic in a number of cases, however.

Source: Prentke Romich Company, Wooster, Ohio

Consultant: Carol Cohen

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OHIO FUNDING AGENCIES AND RESOURCES

Easter Seal Society
2204 S. Hamilton Road
Columbus, OH 43232
614/868-9126

Make-A-Wish Foundation
2600 N. Central Avenue
Suite 936
Phoenix, AZ 85004
602/240-6600

Ohio Department of Health
Bureau for Children with Medical Handicaps
P.O. Box 1603
Columbus, OH 43266-0013

Ohio Department of Human Services
Division of Long Term Care
Bureau of Resident Services
Bureau of Community Services
Prior Authorization Coordinator
State Office Tower
33rd Floor
30 E. Broad Street
Columbus, OH 43266-0423
614/466-9243

Ohio Rehabilitation Services Commission
Bureau of Vocational Rehabilitation
Bureau of Services for the Visually Impaired
Independent Living
400 E. Campus View Boulevard
Columbus, OH 43232-4604
614/438-1200 (regional offices)
800/282-4536 (TDD)

Veteran's Administration
Benefits Information and Assistance
200 N. High Street
Room 309
Columbus, OH 43215
800/827-8272

Industrial Commission of Ohio
246 N. High Street
Columbus, OH 43266-0589
614/466-6136

Ohio Bureau of Workers' Compensation
30 W. Spring Street
Columbus, OH 43266-0581
614/466-1000 (regional offices)
800/282-9536

Ohio Department of Human Services
Benefits Administration
Bureau of Medicaid Policy
State Office Tower
30 E. Broad Street
31st Floor
Columbus, OH 43266-0423

Ohio Department of Mental Retardation/Developmental Disabilities
State Office Tower
30 E. Broad Street
10, 12, and 13th Floors
Columbus, OH 43266-0415
614/466-7508 (county MR/DD program or Family Resource Services Program)

Percy Ross
"Thanks a Million"
℅ Local Newspaper

Sunshine Foundation
4010 Levick Street
Philadelphia, PA 19135

United Cerebral Palsy of Ohio
P.O. Box 14780
Columbus, OH 43214

FUNDING RESOURCES

American Speech-Language-Hearing Association
1801 Rockville Pike
Rockville, MD 20852
301/897-5700
800/638-8255 (Consumer Hotline)

Governor's Office of Advocacy for People with Disabilities
7th Floor
8 E. Long Street
Columbus, OH 43266-0400
614/466-9956 (voice TDD)
800/228-5405 (voice/fax)

North East Ohio Society for Augmentative and Alternative Communication
Mace Mentch
Health Hill Hospital
2201 Martin Luther King Drive
Cleveland, OH 44052
216/721-5400 ext. 260, 285

Ohio Department of Education
Division of Special Education
933 High Street
Worthington, OH 43085
614/466-2650

Ohio Resource Center for Low Incidence and Severely Handicapped
470 Glenmont Avenue
Columbus, OH 43214-3292
614/262-6131 (voice)
614/262-1070 (TDD/fax)
will provide Special Education Resource Center contacts

United States Society for Augmentative and Alternative Communication (USSAAC)
℅ Barkley Memorial Center
University of Nebraska
Lincoln, NE 68588
402/472-5463

Association for Retarded Citizens
360 S. Third Street
Suite 101
Columbus, OH 43215

Center for Special Education Technology
Council for Exceptional Children
1920 Association Drive
Reston, VA 22091-1589
800/873-8255
Selected readings: Funding Technology Products and Services

National Rehabilitation Information Center
8455 Colesville Road
Suite 935
Silver Spring, MD 20910
301/588-9284
several funding publications

Ohio Coalition for the Education of Handicapped Children
933 High Street
Suite 106
Worthington, OH 43085
614/431-1307

Ohio Legal Rights Services
8 E. Long Street
5th Floor
Columbus, OH 43266-0523 614/466-7264

Ohio Speech and Hearing Association
9331 S. Union Road
Miamisburg, OH 45342
800/866-6742

LEVEL: GENERAL

GOAL: **#6** Gain practical information regarding obtaining funding for assistive technology devices and services.

COMPETENCY TYPE: SKILL

OBJECTIVE: Participants will recognize and discuss considerations of the funding process unique to preschool-aged children.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
1. Small group activity Split up into small groups. Ask small groups to brainstorm what special issues and concerns may arise within the funding process based on the unique needs of young children.		
2. Large group activity After 10 minutes, ask groups to report back, and record their ideas on a Flip Chart. Encourage discussion. Here are some points which you may wish to integrate into your discussion: – The critical importance of long-range planning in the selection of a device or system for a preschool-aged child. To what degree will the device allow for future growth across domains — cognitively, physically, linguistically, academically, socially? Will this device limit the child in any of these respects? If so, is it modifiable, or would another system be necessary? Would the rapid changes in technology likely require a future upgraded system?	2. Flip Chart and markers	

LEVEL: GENERAL *(continued)*

GOAL: **#6** Gain practical information regarding obtaining funding for assistive technology devices and services.

COMPETENCY TYPE: SKILL *(continued)*

OBJECTIVE: Participants will recognize and discuss considerations of the funding process unique to preschool-aged children.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
– Recognition that some professionals and/or parents may not be wholly supportive of technological solutions for very young children. Some may feel that young children should have greater opportunity to "catch up" before large sums of money are invested and/or specific technological solutions are implemented. – Recognition of the fact that while funding for assistive technology is a relatively recent development, a history of obtaining funding for many newer types of assistive technology for preschoolers is hardly established. Private insurance may tend to deny for developmental reasons. Cases may have to be built upon arguments of "prevention intervention." Early vocational skills may also become a possible rationale. – If traditional systems do not prove fruitful for obtaining funding for preschool-aged children, it may prove necessary for group advocacy to lobby for new resources for this population.		

LEVEL: GENERAL

GOAL: **#6** Gain practical information regarding obtaining funding for assistive technology devices and services.

COMPETENCY TYPE: VALUE/ATTITUDE

OBJECTIVE: Participants will appreciate that funding for the best *is* always available — the necessary ingredients are PATIENCE and PERSISTENCE.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
1. Small group activity Pass out case studies A and B to the group. After everyone has read them, split the group in half. Ask Group A to meet together for five minutes and generate a list of words or phrases which describe the advocate in Case A. Similarly, ask Group B to generate a list which describes the "advocate" in Case B.	1. Handout (G-H27) *Case Studies A/B*	
2. Large group activity After 5-10 minutes of group discussion, record the characteristics of Advocate A in a bright colored marker on the Flip Chart. The group will probably offer words like "patient," "dedicated," "unceasing," "informed," "well-connected," "persistent," etc. Record the characteristics of "advocate" B in black marker. You'll probably hear "doubting," "unorganized," "uninformed," etc. Remind participants that research has shown that the most critical determinant in the successful obtaining of funding is the presence of a strong advocate. Most literature cites two primary characteristics. Ask participants which two characteristics are most important. Point out that they are PATIENCE and PERSISTENCE.	2. Flip Chart, bright marker, black marker	
3. Large group activity Close with Transparency G-T16, *Funding for the best is always available.*	3. Transparency (G-T16) *Funding for the best is always available.*	

CASE A

Brian is a five year old with a progressive neurological disorder which severely affects his speech. At age three, his mother worked closely with school officials and a local clinic to secure an appropriate evaluation of his needs for an augmentative communication system. Mrs. S. talked with the specialist at the clinic and learned the names of two other parents who had success in securing funding for their children's devices through private medical insurance. The specialist also explained to Mrs. S. the need for supportive letters from multiple sources proving medical necessity for her medical insurance. Mrs. S. contacted the other parents and arranged to meet them and their children over the next weeks. During this period, she also scheduled an appointment with her insurance representative and received information regarding necessary steps for submitting her claim. Contact with the specialist at the AAC clinic resulted in her realization that she should also talk with Ohio Rehab Services and Medicaid to see if Brian might qualify for funding. She followed up by scheduling appointments and receiving claim information.

Visits with parents resulted in gaining many tips. She learned that making the claim more personal with the inclusion of photographs would increase her chances. With copies of letters from the others, she began to outline what information she needed included in letters from Brian's physician, speech therapist, occupational therapist, and preschool teacher. She scheduled appointments with each of them, and prepared materials for each meeting. At each, she asked for their support in specific ways. She explained carefully and clearly what information was needed in their respective letters of recommendation. Over the next three months, she was able to gather all supportive documentation, and submitted her claim. She called her contact person weekly with firm but positive reminders of the urgency of Brian's needs. Meanwhile, she submitted a Medicaid claim, using the same documentation.

When the refusal was received from private insurance, Mrs. S. was disappointed, but decided to contact the other parents again to see if their experience also included the need for appeal. Once again, Mrs. S. met with another parent and found out how to initiate a successful appeal. She learned that allowing the insurance representative to become more personally in touch with the child was often helpful. She invited the representative to visit Brian at his school, and when this was successful, she planned a time when Brian could accompany her on her regular visit to meet with the representative. At this visit, she provided a direct opportunity for the representative to see the large degree to which Brian was unable to communicate. Mrs. S. also asked the AAC Specialist to provide an ongoing observational log of Brian's inability to communicate his vital daily medical needs.

Mrs. S. asked the specialist to accompany her and Brian to the appeal hearing. The specialist provided oral and written testimony with video clips from his preschool setting. Additional documentation was also provided from his teacher and therapists.

After two more weeks, Mrs. S. and Brian learned that the request had been approved. Mrs. S. now works at the local AAC clinic as a parent-to-parent volunteer.

CASE B

Another child at Brian's school is Ben, a five year old with severe communication difficulties resulting from cerebral palsy. Ben's teacher asked his case manager, Ms. X if an augmentative communication system had ever been investigated for Ben. The caseworker shared the following information:

Almost two years before, Ms. X had been asked by her supervisor to coordinate funding pursual for a device that had been recommended by his teacher at that time. Ben's parents had asked for community donations, but had collected only $200. Ms. X had offered to help by sending letters to local organizations, but had gotten no replies. Ms. X said she also had called the parent's private insurance, and after no forms were sent for three months, she called and made another request for forms. Six months later, the parents mentioned at Ben's IEP meeting that they had completed and sent the forms. When the claim was denied, the letter had stated that the request did not seem to involve a medical need. The parents and Ms. X seemed to feel that they had "given it their best effort."

Funding for the best *is* always available!

Funding success is 100% dependent upon the perseverance of the client advocate.

Prentke Romich Company

PROJECT PREPARE

Modules for Competency-Based
Personnel Preparation in
Early Childhood Education

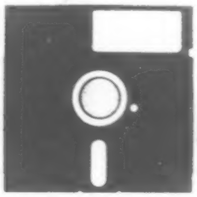
Technology

Staff

GOALS

1. Gain an overview of assistive technology and its integral role within curricular strategies for young children with disabilities.
2. Become familiar with switch application as a means of allowing young children with disabilities greater opportunity for independent control and participation.
3. Gain introduction to basic use of computer and peripherals with young children who have disabilities.
4. Explore how application of computers and peripherals can be successfully integrated within a curriculum for young children with special needs.
5. Gain an overview of augmentative/alternative communication (AAC) system as a means of meeting the needs of young children with severe communication difficulties.
6. Gain practical information regarding obtaining funding for assistive technology devices and services.

Technology



LEVEL: STAFF

GOAL: **#1** Gain an overview of assistive technology and its integral role within curricular strategies for young children with disabilities.

COMPETENCY TYPE: KNOWLEDGE

OBJECTIVE: Participants will become familiar with several ways technology can impact the lives of young children with disabilities.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
1. Large group activity Distribute Handout S-H1, *Preschool Children*, and point out the broad range of technology which is available to support the acquisition of early learning milestones.	1. Handout (S-H0) Tech Use Guide: *Preschool Children* (from CEC) Personal slides (if available)	1. Introduce the section by explaining that technology in today's world is used to enhance independence, and to increase social, play, and communication skills in young children. Leader should make mention of other devices that they have used with young children. Make sure that the wide range of technology is emphasized — both "low tech" and "high tech." In addition to the applications shown on slides, the leader may choose to mention items such as: - Muppet Learning Keys (early childhood keyboard for computer input) - Items children with visual impairment might utilize, such as Talking Books, Magnifiers, Beeper Ball (a ball with auditory signal; the child can hear it approaching), Braille printer (prints pictures with tactile feedback), Textured overlays for communication devices or Power Pad, etc. - Items children with hearing impairment might utilize, such as FM auditory systems, Echo Speech Synthesizer with headphones (adds auditory output for computer programs), use of an amplified classroom, etc.

LEVEL: STAFF *(continued)*

GOAL: **#1** Gain an overview of assistive technology and its integral role within curricular strategies for young children with disabilities.

COMPETENCY TYPE: KNOWLEDGE *(continued)*

OBJECTIVE: Participants will become familiar with several ways technology can impact the lives of young children with disabilities.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
		Personal slides that exemplify devices can be shown if available. Based on availability, leader can show or demonstrate additional items. Families may have concerns about some aspects of technology in modern life in general and/or in the specific context of education. These may be associated with cultural values and practices (e.g., religious). Encourage discussion of such issues.

PRESCHOOL CHILDREN

Babies and young children quickly learn that their daily interactions with the environment produce effects. Play is the child's way of learning. Looking, interacting, manipulating, crawling, toddling, and exploring are actions which begin early learning experiences. The sooner diversified experiences are introduced, the faster the child will learn to influence and control his or her environment.

Many children with disabilities are unable to interact with their environment. Thus, their development may be hindered. When early motor or intellectual experiences are restricted, delayed, or distorted, other lines of development are adversely affected as well. Lack of early experiences will affect later learning and socialization.

Young children with disabilities need early successful experiences in controlling their environment as do their peers without disabilities. Technology is one alternative which may provide successful opportunities when the child is unable to receive quality experiences through natural means. Many toys can be easily adapted so they can be controlled by a child who is severely physically disabled. Similar adaptations to a computer can provide access to a wide variety of computer-controlled environmental experiences for the very young child with disabilities.

Not only will technology benefit young children who are severely disabled, but will also augment the experiences and learning opportunities of children with mild disabilities. Computers can be used as a tool for learning other skills such as readiness concepts, visual motor coordination, and social skills. Children who use the computer at an early age will have the advantage of growing up with the technology and using it to their benefit throughout life. They stand to gain more and lose less through increased learning opportunities presented by the technology.

The Technology

A computer system for a young child should allow the use of alternative input devices and provide good color graphic output. Most young children are not ready for the standard computer keyboard thus alternatives should be available that easily connect to the basic computer system. These may include alternative keyboards, touch pads, pointing devices, and switches. Most programs for young children utilize color graphics, sound, and motion rather than written text so alternative output devices may be required. These may include a color monitor, voice synthesizer, or an environmental control unit.

Play

Within the natural play environment, many developmental opportunities are presented in unstructured ways. Toys and other objects are found to entertain, allow curiosity to develop, and provide opportunities for motor coordination and language development. For children with physical limitations who cannot independently participate in these unstructured play environments, the technology can help structure similar play opportunities that promote positive interactions. A simple example is using a battery operated toy equipped with a switch (such as a train or animal) to give control of play activity to the child. By activating the switch (e.g. pressing, touching, or rolling on top of it) the child can manipulate the toy. Infants as young as three months have "played" in computer-controlled environments to discover relationships between their actions and objects in their environment. These planned environments can also encourage motor development by positioning toys to encourage arm placement, pointing, and posture control.

As children grow older they love to play games. Preschoolers are just beginning to learn cooperative play. Computers offer unique opportunities to play games because they can direct turn taking and neutralize some of the motor skills needed to play. Consequently they can provide a recreational outlet for many nonverbal children and children with severe physical disabilities as well as their peers without disabilities. For example, a computer can simulate a board game. Using a switch or other alternative input device, the child activates the computer-generated spinner and moves to the next spun color or number space. Other examples include moving target games, matching exercises, and story boards.

Learning

During the early development years there is little differentiation between communication, language, and cognition. Early communication begins with intentional actions that gain someone's attention. The child with very severe disabilities may have no means to achieve this goal. Toys and buzzers activated by simple switches could be used for this early rudimentary communication task. A computer system can also be designed to assist with communication on this very early developmental level and can also be designed to assist on highly sophisticated levels, depending on the user's needs. This versatility makes the computer a viable option for communication devices — it can change with the changing communication needs of the user. For more infrmation about this topic request the Tech Use Guide on Augmentative Communication from the Center.

There are several ways the computer can be used to assist in the development of language skills. The computer can function as a beginning communication device and language acquisition aid. Some of the alternative keyboards have authoring programs that allow the board to be used as an alternative communication device or as a talking board that teaches and reinforces language concepts. Vocabulary with these programs can be changed in a matter of minutes.

Other programs are designed to teach higher level expressive and receptive language skills. Talking word processors which pronounce letters, numbers, words, phrases, and full text can be used to introduce language to students. In this application the computer becomes a tool for teaching reading and writing as well as language and communication.

In addition to language skills, computers can be used to teach independence. With a switch operated toy, a child can learn cause/effect relationships and choice selection and improve memory skills. These are just some of the basic skills needed to learn other skills later.

Motor and perceptual skill development are two other areas of learning in which the computer can assist the young child with disabilities. Visual-perceptual skills can be taught and reinforced through the use of simple game-like programs that use moving visual targets and timed motor responses to gain reinforcement. Another motor training application is the use of switches to promote postural changes or specific muscle movements. An example is placing a mercury switch on a child's head — when the child brings his or her head to an upright position, the tape player turns on reinforcing music.

Assessment

The computer can provide an opportunity to assess children at an earlier age. Alternative input devices allow the child to demonstrate cognitive abilities unhampered by delayed motor abilities. For example, with a touch sensitive screen, the child merely touches the computer screen to indicate a selection. Or a child can touch a picture which is placed on an alternative keyboard (e.g. Power Pad or Unicorn Board). By using these and other devices, the teacher can be more assured of assessing the target cognitive skill rather than the child's motor disability.

Access

For many preschoolers, including those with disabilities, the standard keyboard is not the best input method. Tiny hands often have a hard time pressing the small keys. Also, many preschoolers are nonreaders and have not mastered the alphabet, let alone the keyboard. Well designed software programs for young children overcome these barriers. Often preschool software programs only use a handful of keys. By highlighting the keys or blocking all others out, the child can become very successful with the task at hand. Stickers placed on important function keys (e.g. spacebar or return), keyguards, or a homemade mask which denotes only specific key area, are some helpful and easy solutions.

For children who need more than a minor modification, other alternatives include joysticks, game paddles, light pens, touch windows, a mouse, or expanded keyboard. These commonly available devices require specially written, but fairly common, software. Other specialty input devices such as switches, eyetrackers, and headpointers require special purchase and special programs. Many alternative keyboards require special software. Sometimes an adaptive firmware card will need to be installed in the computer before an alternative keyboard, switch, or scanning device can be used.

Selecting the appropriate device will depend on the specific needs of the child. For more information about this topic, request the Tech Use Guide on Computer Access from the Center.

Software

Before selecting any software program, determine the prerequisite skills needed to operate the program and the functioning level of the preschooler. These criteria are very important and should influence your decision. When teachers and parents first introduce a computer to a child, the goals should be to allow the child to use it as independently as possible, have a positive experience, feel in control, and be successful. Important features that software for preschoolers should possess include:

- **Clear, concise documentation.** The documentation or teacher's guide should be easy to read and informative.
- **Sound educational value.** Software should support the curriculum, reinforce correct answers, provide cues for incorrect answers, not provide rewards for incorrect answers (they should be ignored), and present a reading level that matches the child's ability.
- **Color, graphics, and sound.** Software should be colorful, interesting, animated, and enhanced with sound. Screens should be uncluttered, shapes easily recognizable, and if print appears on the screen it should be large enough for a preschooler to read. If a child is prone to seizures, avoid programs with flashing lights or graphics which may activate a seizure.
- **Adaptability.** The program should be modifiable. You should be able to change the level of difficulty, content, speed of presentation to fit the child.
- **Limited key input or alternative device usage.** Many preschoolers cannot use standard keyboard. As already mentioned the keys are too small, too close together, require too much pressure to activate, are too far from the child's reach, or are not in sequential order. Limiting key input to one or two keys is one solution, alternative devices are another.
- **Data collection.** If you are using the software for training or instruction, a management program is desirable. Information such as the number of correct responses, number of trials, or actual raw data will help you plan the child's program more effectively.

While you may think of other features that are important for the individual needs of your students, this guide will help you get started. Develop a list of features that are most important for your students. Narrow your selection to two or three programs. Review all programs before any are purchased.

GLOSSARY

Adaptive Firmware Card (AFC) — The AFC is a small circuit board that is placed inside the computer. A small external connector box, which comes with the AFC, is mounted on the side of the computer. Switching devices plug into this connector box. The AFC allows the computer to be accessed by any one of 16 input methods, depending on the physical ability of the user and the type of switch needed. Various input methods include: expanded keyboards, switches, morse code, and augmentative communication devices. The AFC also has several other features which are appropriate for use with young children. For example, one feature allows one to slow down the speed of the computer and thus slow down the action of an arcade-type computer game.

Alternative input device — Traditional or standard input to a computer is the keyboard. However, for many children with disabilities, standard input devices are a barrier to computer use. Non-traditional or alternative input devices have been designed to give the child a means to access the computer. These include expanded keyboards, switches, joysticks, touch windows or voice input.

Alternative keyboards — Touch sensitive boards which attach easily to the computer and bypass the standard keyboard as the input device are known as alternative keyboards. Some keyboards, through special programming, can change the definition and size of the keys to be altered by allowing several adjacent keys to act as one large key. Keyboards vary on the degree of pressure needed to activate the software.

Detachable keyboard — A keyboard that is not attached to the central processing unit (CPU) of the computer. A detachable keyboard usually attaches to the computer via a coiled cable much like that of a telephone cord. This keyboard can be placed just about any place the cord will reach (e.g., in a child's lap or on the floor).

Expanded keyboard — A large, oversized keyboard that replaces the traditional keyboard. Examples include the Muppet Learning Keys, the Power Pad, and the Unicorn Board.

Keyguard — A plastic or metal sheet with finger-size holes in it that correspond to the key locations of the keyboard. The keyguard is placed over the computer keyboard to help people with poor motor control select the right keys. Some have latching keys that allow the user to hold down two keys at once with only one finger or a headstick.

Mask — A device that is placed over a keyguard to block out extraneous keys and to place focus on a specific key area (e.g., return key). These are usually made out of cardboard and are noncommercial.

Membrane keyboard — A keyboard which is similar in function to a standard keyboard, but is generally more rugged and larger. The membrane protects the keyboard circuitry from moisture or spills. Some membrane keyboards are also programmable for added flexibility. Examples include the Muppet Learning Keys and the Power Pad.

Speech input — The ability of a microcomputer to recognize speech as a form of data input.

Speech output — A method of output that enables a computer to reproduce speech via a speech synthesizer.

Speech recognition — The technology of making a computer understand human speech, which makes it possible to transmit data or instructions to a computer with voice commands.

Speech synthesizer — A method of output that enables a computer to reproduce speech.

Switch — A device that allows alternative access to a computer or battery operated toys. The most common switches are push, lever, leaf, wrinkle, and sip and puff. Pressure against a switch turns it on while release of this pressure turns the switch off.

Touch sensitive — A touch sensitive device is a method of input which is activated by a light pressure of the hand or stylus.

READINGS

Burkhart, L. J. (1982). *More homemade battery devices for severely handicapped children with suggested activities.* College Park, MD: Author. Available from L. J. Burkhart, 8503 Rhode Island Avenue, College Park, MD 20740.

Burkhart, L. J. (1987). *Using computers and speech synthesis to facilitate communicative interaction with young and/or severely handicapped children.* College Park, MD: Author. Available from L. J. Burkhart, 8503 Rhode Island Avenue, College Park, MD 20740.

Morris, K. J. (1989). Alternative computer access methods for young handicapped children. *Closing the Gap,* 7(6), 1-15.

Pressman, H. (1987). *Making an exceptional difference: Enhancing the impact of microcomputer technology on children with disabilities.* Boston, MA: Exceptional Parent.

Rauschert, M. & Schneider, C. (1988). The use of robots in the preschool handicapped classroom. *Closing the Gap,* 7(4), 24-25.

Robinson, L. & Rauschert, M. (1988). Computer technology as a tool for preschool handicapped children. *Closing the Gap,* 7(4), 26-29.

Wright, C. & Nomura M. (1985). *From toys to computers: Access for the physically disabled child.* San Jose, CA: Author.

PERIODICALS

Closing the Gap, P.O. Box 68, Henderson, MN 56044.

Exceptional Parent, 1170 Commonwealth Avenue, Third Floor, Boston, MA 02134.

Journal of Early Intervention, The Division for Early Childhood, The Council for Exceptional Children, 1920 Association Drive, Reston, VA 22091.

Teaching Exceptional Children, The Council for Exceptional Children, 1920 Association Drive, Reston, VA 22091.

Topics in Early Childhood Special Education, PRO-ED, 5341 Industrial Oaks Boulevard, Austin, TX 78735-8809.

SOFTWARE RESOURCE LIST

Alphabet Circus, DLM Teaching Resources, One DLM Park, Allen, TX 75002, 800-527-4747.

Early Games for Young Children, Springboard Software, Inc., 7807 Creekridge Circle, Minneapolis, MN 55435, 612-944-3912.

Keytalk, Peal Software, Inc., 2210 Wilshire Boulevard, Suite 806, Santa Monica, CA 90403, 213-451-0997.

Language Development Series, Scott, Foresman & Company, 1900 East Lake Avenue, Glenview, IL 60025, 312-273-5900.

Reading Readiness: Visual Discrimination, EMC Publishing, 300 York Avenue, St. Paul, MN 55101, 800-328-1452.

ALTERNATIVE INPUT SOFTWARE RESOURCE LIST

Alphabet with Tom and Andy, Dunamis, Inc., 3620 Highway 317, Suwanee, GA 30174, 800-828-2443.

Exploratory Play, Peal Software, Inc., 2210 Wilshire Boulevard, Suite 806, Santa Monica, CA 90403, 213-451-0997.

First Words, Laureate Learning Systems, Inc., 110 East Spring Street, Winooski, VT 05404, 802-655-4755.

Gertrude's Secrets, The Learning Company, 6493 Kaiser Drive, Fremont, CA 94555.

Keys to Success: Computer Keyboard Skills for Blind Children, Life Science Associates, 1 Fenimore Road, Bayport, NY 11705, 516-472-2111.

The New Talking Stickybear Alphabet, Optimum Resource, Inc., 10 Station Place, Norfolk, CT 06058, 800-327-1473.

SPEECH SYNTHESIZERS

Cybertalker, Cyberon Corporation, 1175 Wendy Road, Ann Arbor, MI 48103, 313-665-8512.

The Echo Family of Speech Synthesizers, Street Electronics Corporation, 1140 Mark Avenue, Carpinteria, CA 93013, 805-684-4593.

Personal Speech System, Votrax, Inc., 1394 Rankin Road, Troy, MI 48083-4074, 800-521-1350.

INPUT DEVICES

Muppet Learning Keys, Sunburst Communications, 39 Washington Avenue, Room EP, Pleasantville, NY 10570, 800-431-1934.

TouchWindow, Edmark Corporation, 14350 North East 21st Street, Bellevue, WA 98009-3903, 800-426-0856.

Unicorn Expanded Keyboard, Unicorn Engineering Company, 6201 Harwood Avenue, Oakland, CA 94618, 415-428-1626.

SWITCH MANUFACTURERS

CompuAbility Corporation, 40000 Grand River, Suite 109, Novi, MI 48375.

Don Johnston Developmental Equipment, P.O. Box 639, 1000 N. Rand Road, Bldg. 115, Wauconda, IL 60084-0639, 800-999-4660.

Prentke Romich Company, 1022 Heyl Road, Wooster, OH 44691, 216-262-1984.

Steven E. Kanor, Ph.D. Inc., 8 Main Street, Hastings-on-Hudson, NY 10706, 914-478-0960.

TASH (Technical Aids & Systems for the Handicapped, Inc.), 70 Gibson Drive, Unit 12, Markham, Ontario, Canada L3R 4C2, 416-475-2212.

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Additional **Tech Use Guides** on the following topics are available from the Center upon request:

- Guide for Teachers
- Guide for Parents
- Technology for Work, Home, and Leisure
- Computor Access
- Selecting Software
- Selecting Hardware
- Learning Disabilities
- Hearing Impairments
- Physical Disabilities
- Visual Impairments
- Telecommunication Networks
- Augmentation Communication

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LEVEL: STAFF

GOAL: **#1** Gain an overview of assistive technology and its integral role within curricular strategies for young children with disabilities.

COMPETENCY TYPE: SKILL

OBJECTIVE: Given a case study, participants will identify ways that technology could impact the life of a young child with a disability.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
1. Large or small group activity Present the case study on Transparency S-T1. Ask participants to plan appropriate applications of technology for this child. You may choose to use the following case study or adapt one based on the particular population served by the group. **Case Study:** Johnny is a four-year-old child with cerebral palsy and a mild developmental delay. He has weakness in his motor control and finger dexterity. He is not able to hold his crayons, and has a difficult time manipulating the toys in the classroom. Leader should attempt to elicit ideas from the group on possible use of technology. Suggested applications for discussion: – Adapted toys with switches – Use of coloring software on the computer (e.g. Electric Crayon) with some type of adapted access, if necessary. These might include use of a keyguard, switch, Power Pad, or Touch Window.	1. Transparency (S-T1) *Case Study*	1. In exploring ideas elicited by group, integrate these important ideas within the discussion: – Emphasize the importance of a *transdisciplinary team approach* in planning technological applications. Discuss the unique perspective that each team member brings to the process (e.g., parent, teacher, speech/language therapist, OT, PT, other related service personnel). Highlight the critical role played by *family involvement.* – Emphasize the importance of using an approach which *integrates the technological application within the normal curricular activities.* – Have participants plan specific applications of technology which would *encourage development of play, socialization, communication, and independence.*

LEVEL: STAFF *(continued)*

GOAL: **#1** Gain an overview of assistive technology and its integral role within curricular strategies for young children with disabilities.

COMPETENCY TYPE: SKILL *(continued)*

OBJECTIVE: Given a case study, participants will identify ways that technology could impact the life of a young child with a disability.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
– Use of software and speech synthesizer on the computer for language development. Examples might be Keytalk, Exploratory Play, or Sticky Bear Opposites. If Johnny is in a wheelchair, modifications may need to be considered to ensure access to his physical environment. To illustrate the team approach and the importance of family involvement within this case study, the following points might be made: – Johnny's speech/language therapist can contribute valuable suggestions for his vocabulary development with software application. – The O.T. and P.T. can ensure that he is seated properly at the computer to maximize the most efficient access. – The parent can provide Johnny's favorite toy to encourage high levels of motivation for learning to use a switch. To emphasize the need for integrating Johnny's technology within the class' normal curricular activities, points such as the following might be made:		

LEVEL: STAFF *(continued)*

GOAL: **#1** Gain an overview of assistive technology and its integral role within curricular strategies for young children with disabilities.

COMPETENCY TYPE: SKILL *(continued)*

OBJECTIVE: Given a case study, participants will identify ways that technology could impact the life of a young child with a disability.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
– Johnny is able to complete his art projects with the other students by using the drawing or coloring software. At other times, he is able to complete the regular class activities by using a special hand splint. – Johnny is able to participate in the group play time by using an adapted toy.		
2. Large group activity Leader may present Transparency S-T2, *General Principles for Applying Early Childhood Technology* and ask participants if their ideas have been in keeping with these general principles. Participants may discuss possible modifications to their original ideas.	2. Transparency (S-T2) *General Principles for Applying Early Childhood Technology*	

S-T1

CASE STUDY

Johnny is a four-year-old child with cerebral palsy and a mild developmental delay. He has weakness in his motor control and finger dexterity. He is not able to hold his crayons, and has a difficult time manipulating the toys in his classroom.

GENERAL PRINCIPLES FOR APPLYING EARLY CHILDHOOD TECHNOLOGY

- Transdisciplinary team approach
- Active family involvement
- Integration of technology into regular curricular activities
- Applications encourage development of play, socialization, communication, and independent functioning.

LEVEL: STAFF

GOAL: **#1** Gain an overview of assistive technology and its integral role within curricular strategies for young children with disabilities.

COMPETENCY TYPE: VALUE/ATTITUDE

OBJECTIVE: Participants will develop an appreciation for the ability of applied technology to enable children to perform developmentally appropriate activities.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
1. Large group activity Ask participants for examples of the impact of technology on their own lives. i.e. contrast: typing-word processing carbon paper - xerox cooking on stove - microwave writing - phoning or faxing typing - word processing		1. Within this discussion, be sure to highlight the Four General Principles: – Transdisciplinary Approach – Family Involvement – Integration of technology within regular curricular activities – Applications encourage development of play, socialization, communication, and independent functioning. Emphasize that use of technology is not the goal itself, but that its use enables the child to independently perform activities determined to be developmentally appropriate.
2. Large group activity Ask for examples of how young children can experience similarly drastic improvements in their ability to do their "work" with the use of technology. When children are able to play with technological adaptations (switches, adapted toys, computer program), they can achieve developmental progress in the areas of communication, cognitive, perceptual motor skills, problem-solving skills, and socialization. Play is the motivator for young children; technology allows them to participate in developmentally appropriate activities.	2. Handout (S-H1) *Families and Technology*	

FAMILIES AND TECHNOLOGY

Not only are parents* and extended family members the first and primary teachers of their children, they are children's life-long advocates. So if young children are to receive the benefits of technology experiences, families must be included in the entire effort, from the initial decision to explore the possibility of technology use for their children through the day-to-day experiences with equipment and decisions about software. Family members' suggestions enhance the likelihood that computer activities will be appropriate for a particular child. When a mother tells you, "He really likes music, but fuzzy textures seem to frighten him," she provides the information you need to determine appropriate initial software and choices for switches.

ACTT's family participation component reflects the emphasis on family involvement required in federal legislation. Public Law 99-457 states that "whenever appropriate and to the extent desired by parents, the preschooler's Individualized Education Plan (I.E.P.) will include instruction for parents." Technology workshops and parent meetings which meet parents' needs for computer information and skills are a part of ACTT programs. Part H of P.L. 99-457, which impacts handicapped infants and toddlers, directs that Individual Family Service Plans (IFSP) be developed. Including technology information and skills in the IFSP is both an important element for families of young children and easily "do-able" if staff members are ready to teach family members, using appropriate "adult learner" strategies.

Differences in Family Participation

Families require different levels of input into their children's programs, depending on daily living pressures, available time, perceptions of their role as parents, and a myriad of other factors (e.g., more mothers are now working because of economic necessity). On one hand, some parents may want the professional to make all the decisions and carry out activities since that is, according to the parents' perception, supposed to be the professional's role. These parents may want information but not participation. On the other hand, some parents wade right in, take major responsibility for all intervention activities, and make informed decisions about future directions for their children. Families' participation ranges on a continuum between the two.

Although it is beyond the scope of the **Building ACTTive Futures,** current literature on early intervention clearly defines family systems and the approaches families from various cultures deem acceptable. A clear understanding of family systems is necessary when decisions about technology applications are being made in an early intervention program.

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*The terms "parents," "family members," and "primary caregivers" are used interchangeably in this section.

When children are very young and/or severely disabled, the input and interest of families is more critical to the success of computer applications than it may be for the more mildly involved children in a preschool classroom. If parents or primary caregivers are not committed to the importance of technology applications for their children with severe disabilities, results are diluted. If a young child must use a communication program to indicate what s/he wants to eat, drink, or play with, using the same or a similar system at home as at school provides continuity, repeated practice, and a better chance of success. In this case, parents need to be directly involved with their child's program and knowledgeable about the equipment and software. On the other hand, direct participation of parents is not critical to the success of a mildly involved child who spends a morning in a preschool program learning about directionality by moving a Logo turtle through a maze.

Since technology is an exciting part of our world, family interest is usually high. Acquiring technology skills may very well provide a marketable new skill for mothers, fathers, grandparents, and other family members. Often the addition of technology to early intervention efforts results in a higher level of father interest and participation. Mothers, as well, are intrigued by the possibilities computers offer for themselves and for their children. Learning more about the potential and the effects of technology on children's developing skills and abilities is a high priority for most parents.

Levels of Family Participation in ACTT

Being "involved" does not necessarily mean that family members have to be present in the classroom. Parents can be involved in their child's program in many ways. Some parents choose passive involvement, demonstrating an awareness and support of their child's activities. Other parents may actively participate in computer activities, learning all they can about computer use for their child and themselves. And other parents may become active leaders, choosing to assist with activities in the classroom.

Because we recognize the differences in family participation, ACTT plans for three different levels of parent involvement:

1. awareness of aspects of technology intervention,
2. assisting with technology intervention, and
3. conducting technology interventions.

In one sense, the levels are sequential, from beginning to learn about technology applications to a growing sophistication in computer adaptations. However, the choice of level of participation will vary depending on family commitments. At all times family members decide upon their own level of participation. We believe that providing inviting opportunities for acquiring further computer skills promotes the potential for increasing involvement. We include activities for each level of involvement together with sections dealing with aspects of birth through three and severely disabled programs as well as preschool classrooms.

Source: Building ACTTive Futures, ACTT's Curriculum Guide for Young Children and Technology. Macomb Projects, College of Education, Western Illinois University, Macomb, IL 61455.

THREE TO FIVE
Parent Participation in Technology Activities

No matter the age or disabling condition of their children, levels of family involvement are similar. Those who work with the preschool population should refer to the previous sections for general philosophy and practices for working with parents.

Parents are more willing to participate in computer activities if they feel comfortable and competent at the computer. Competencies parents need to assist and conduct computer activities are listed in Figure 1. For a more detailed set of competencies for parent and staff training, refer to the "Competencies" chapter in this curriculum guide.

The adults should also know how to handle equipment properly. Knowing the correct names of the computer components (monitor, disk drive, keyboard, etc.) is useful. Computer terminology somewhat overwhelms people at first, but once they learn a few words and can speak the 'lingo,' it's not so frightening. Thorough knowledge of what to expect from a piece of software is important if an adult is going to conduct a computer session.

Information Level

Providing information about classroom computer availability and the intended use of computer activities in the curriculum are the first steps in involving families in educational computing. Two options for providing families with this information are a newsletter and a parent meeting.

A weekly or monthly newsletter sent to all families involved in the program is an excellent way to introduce the computer and computer activities. Read the section on Severe Disabilities for ideas on what such newsletters could contain. Throughout the school year, newsletters can inform parents about the new software being used, ways the computer helps children meet IEP goals, and future plans for classroom computer use.

A workshop or informal meeting effectively introduces families to the computer's role in their children's education. These meetings provide opportunities to demonstrate the types and attributes of software and peripherals and the ways children will be using the computer at school. Parents are encouraged to become acquainted with the computer, software, and peripherals through "hands-on" activities. Some parents may express particular interest in the computer and will want to learn more about their child's computer activities. Computers are good incentives for getting fathers involved.

In planning an awareness workshop, keep the atmosphere as informal and non-threatening as possible. The goal is to establish awareness of children's classroom activities and to provide opportunities for hands-on experience that may spark some interest and curiosity or alleviate fears about handling the computer. A relaxed friendly atmosphere will make parents comfortable in what may be a new experience and environment.

Assistance with Intervention

Once families know about their children's activities with the computer, they may want to see them using the computer. Parents who are able to come to the classroom may schedule a visit at a time when they can observe their child working individually and as part of a group. Such visits provide opportunities for the teacher to model computer teaching strategies for the parents and for the parents to provide feedback about their child's use of the program.

An after school or evening workshop enables family members who cannot visit the classroom during the day to observe their children at the computer. In addition, this workshop provides siblings the opportunities to observe and interact with each other in unique ways. A foundation for sibling sense of pride is created as the sibling with disabilities demonstrates skills at the computer.

If possible, have several computers available for the workshop and set up individual stations. Ideally, each family attending would have a computer, but if that is not possible, schedule specific times for each family to attend. During the workshop, the child can demonstrate computer skills to his/her parents. Family members soon begin to feel more familiar, and hopefully more comfortable, in interacting with their child at the computer. By modeling questions that encourage thinking skills (What would happen if ...), teachers encourage parents to ask such questions.

This level of involvement is often transitional. Some families will return to observe and ultimately participate in classroom computer sessions. If a parent is willing to assist in computer sessions, plan initial activities that parents can take part in comfortably. Because not all families are at the same level at a given time, schedule after school workshops on an on-going basis. Parents who are knowledgeable and willing may assist in organizing and presenting the workshops.

Conducting Computer Intervention

Results are almost always beneficial when parents work directly with their children. Parents provide ideas for making the intervention more enjoyable, challenging, and personal for their particular child. Parents who reach this stage of involvement see the computer as a valuable tool for helping their children gain new skills and reach IEP goals. With computer use, many goals are achieved that have seemed unattainable. Family members who share learning experiences with their children are rewarded by being part of this achievement.

Once adults are comfortable in assisting with computer activities, they may be ready to conduct a session with their child. As parents move to this level of involvement, they need opportunities to familiarize themselves with the computer and available software programs so they feel comfortable. Beginning activities should be kept simple to assure a successful experience. A teacher may help by

1. providing a clearly written explanation of the activity for review prior to the session,
2. posting directions near the computer to provide a convenient reference allowing for fewer questions and more independence, and
3. assembling all materials at the workstation prior to the intervention.

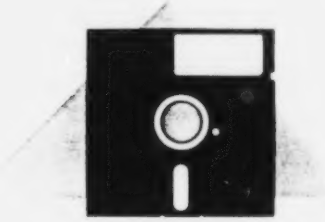
Some parents may be interested in developing their own computer activities for their child. The parent and the teacher should first discuss plans for implementation and their relevance to IEP goals. Once the parent has introduced and conducted the activity, s/he and the teacher need to discuss the effect of the activity, its success and/or failure. Parents are to be praised and thanked for their efforts, no matter what the degree of success.

At level three, it is assumed that parents possess a basic level of computer knowledge. Parent Competencies, listed in Figure 1, target those skills needed by parents to successfully plan and conduct computer intervention for their children. The following section will help teachers organize and conduct computer workshops to provide parents with the knowledge, skills, and confidence needed for them to become involved in the intervention program.

Source: Building ACTTive Futures, ACTT's Curriculum Guide for Young Children and Technology, Macomb Projects, College of Education, Western Illinois University, Macomb, IL 61455.

GOAL 2

Technology



LEVEL: STAFF

GOAL: #2 Become familiar with switch application as a means of allowing young children with disabilities greater opportunity for independent control and participation.

COMPETENCY TYPE: KNOWLEDGE

OBJECTIVE: Participants will learn about types of switches and interfaces and why they are used.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
1. Large group activity The Switch a. Define switch b. Select one adapted battery-operated toy and demonstrate switches with the toy. Identify and discuss each switch as it is introduced. c. Explain to participants that toys can be permanently adapted for switch use by vendors or by individuals, or can be temporarily adapted. Introduce another toy that has been permanently adapted and one that has been temporarily adapted. d. Discuss primary purposes and uses of switch application.	1. Handout (S-H2) *Commonly Used Switches* Handout (S-H3A and 3B) *Switches* *Switch Use* Various switches: Plate, Flat, Mercury, Leaf, or others (available from SERRC or ORCLISH) Switch Toys (available from SERRCs or ORCLISH) Battery Adaptor for temporarily adapted toy. **Supplemental Resources** PITTS Module, *Switch Use* (provided at conclusion of this module), contains additional information.	1. Recommend that participants use Handout S-H2, *Commonly Used Switches* to follow along as each switch is introduced. Leader can refer to enclosed *Switch Use* (from PITTS) and Handout S-H3, *Switches* for additional information on switch access. Explain that a switch is a device used to control an object (i.e., toy, appliance, computer) with a single movement. Children with physical or cognitive limitations are enabled to independently control objects in their environments and thus participate to greater degrees. Explain that switch activation needs to be a reliable, consistent muscle movement, such as press of a hand, turn of a head, or even a blink of the eye. Point out that information from a PT, OT, and parent can be very useful in assessing which muscle movement should be utilized.
2. Large group activity The Switch interface. a. Define switch interface. Depending on resources available: b. Demonstrate switch interface with timer and toy.	2. Handout (S-H4) *Switch Interfaces* Handout (S-H5) *Switch Ideas*	2. Recommend that participants use Handout S-H4, *Commonly Used Switch Interfaces* to follow along as each switch interface is introduced.

LEVEL: STAFF *(continued)*

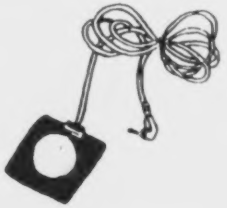
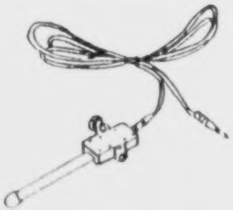
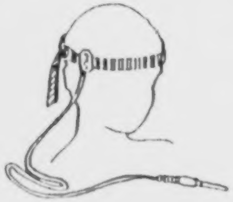
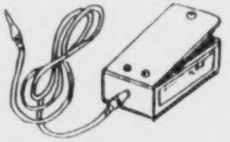
GOAL: #2 Become familiar with switch application as a means of allowing young children with disabilities greater opportunity for independent control and participation.

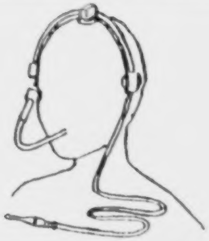
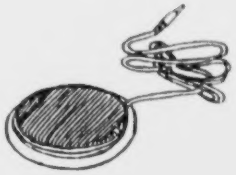
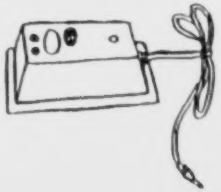
COMPETENCY TYPE: KNOWLEDGE *(continued)*

OBJECTIVE: Participants will learn about types of switches and interfaces and why they are used.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
c. Demonstrate switch interface with control unit and appliance. d. Demonstrate that switches can also be used to access an electronic communication board or computer.	Various switch interfaces, timer, control unit (available from SERRC or ORCLISH) Switch toys, common household appliances (tape recorder, fan, blender)	Explain that a switch interface is a connection between a toy, appliance, or computer and a switch. Interfaces can allow different options for a child. For example, switches interfaced with a timer allow toys or objects to stay on for a predetermined length of time. This may be important for children who do not have the necessary motor control or strength to sustain pressure on the switch.
3. Using examples from Handout S-H4, *Switch Ideas,* discuss how switch use not only allows a child to accomplish a given task, but also provides larger educational benefits, such as: a. Cause and effect as a foundation for learning. b. Environmental control can lead to further exploration. c. The use of switch activities as a motivator for learning and play, and the utilization of switch-activated play as a vehicle for further learning. d. Important developmental goals may be targeted through switch activities, such as: visual attention, imitation, following of directions, visual tracking, initiating and terminating interactions, and turn-taking.		Explain to participants that there are numerous single switch computer programs available for young children.

OVERVIEW OF COMMONLY USED SWITCHES

NAME	EXAMPLE	ACTIVATION	COMMENTS	VENDORS
Flat Switch		Small low force movement of arms, hands, legs, head, etc.	• flat size allows placement under many objects	Don Johnston TASH
Leaf Switch		Flexible switch that is activated when bent or pressed gently	• requires mounting • can improve head control, and fine motor skills	Don Johnston Kanor TASH
Mercury (Tilt) Switch		Gravity sensitive switch activates when tilted beyond a certain point	• can improve head or other posture control • attaches easily with velcro strap	HCTS Kanor TASH
Plate Switch		Downward pressure on plate by hand, foot, arm, leg, or other reliable movement	• most common • can be covered with different textures • some offer music, light, or vibration	Don Johnston Kanor TASH

NAME	EXAMPLE	ACTIVATION	COMMENTS	VENDORS
Sip 'n Puff		Sipping or puffing on tubing	• requires good head and mouth closure • can improve breath control • amount of air pressure adjustable	Kanor TASH
Switch 100 "Big Red"		Light touch anywhere on its top surface	• recommended for young children • click provides auditory feedback • diameter 5"	Ablenet
Voice Activated		. Significant vocalizations (1 to 2 seconds)	• can improve vocalizations • has sound sensitivity control	Kanor

Source: Preschool Integration Through Technology Systems, (PITTS), United Cerebral Palsy Association of Western New York, Inc., 4635 Union Road, Buffalo, NY 14225; US DOE Grant #H024E80010.

SWITCHES

Why a Switch?

A switch is a simple device used to control input into a computer when a keyboard cannot be accessed. Switches are also used as alternative input mechanisms with modified battery-operated toys. Switches enable people with physical or cognitive limitations who cannot use a computer or device, such as a battery-operated toy, the ability to respond to environmental stimuli. Using a battery-operated toy activated by a switch allows even severely disabled children opportunities to control external events. Because they help children understand cause and effect, predictability, and normality, switches provide excellent preparation for future applications of environmental control and communication.

Switch Application and Learning Theory

Children who are otherwise unable to explore their environment can do so with the aid of a switch. Coupled with a computer software program, a switch is a mechanism for response enhancement. Cause and effect relationships can be developed using a software program such as **Switch 'N See** developed by Project ACTT. The child activates a switch, in lieu of a keyboard, to control the program. Battery-operated toys activated by a switch also allow a child the opportunity to control the environment. Once a child begins to realize that he can effect a change in his surroundings, his desire to explore the environment will be further stimulated. On a continuum, cause and effect development often sets the precedence for discriminatory learning. Likewise, when a developmentally disabled child understands the connection between the activation of a switch and a toy's movement, a foundation for independent learning is laid. A child's simple awareness of cause and effect provides a basis for all future learning.

Switches provide predictability and normality for children who cannot access certain devices due to physical or cognitive limitations. Predictability and stability of a child's environment fosters a child's self-satisfaction and autonomy, which is important in all areas of early developmental learning. Using switches with devices such as battery-operated toys gives a child the opportunity to experience normal play. Play encourages the development of social interaction.

Switch Selection

Because the needs and abilities of handicapped children are so diverse, matching the type of switch to the child is crucial for the child to successfully use it. Proper placement of the switch and positioning of the child are two important factors for optimal child response. The child's most reliable, comfortable, and stable body position must be assessed. The child's energies should be focused on operating the switch and responding to the stimuli, not on maintaining the "proper" body position.

After the most reliable body position is determined, the various types of switches can be evaluated. The tread, ribbon, pillow, and mercury switches are the most common switches with prices ranging from $5 to $200. The various types of switches discussed below can be customized to meet the needs of a particular child.

The Tread Switch: A tread switch is pressure operated. Pressure can be applied with the press of a finger, hand, head, or foot. When enough pressure or force is applied to the top of the switch, a connection will be made. As long as the pressure is applied, the circuit will remain completed and the connected device will continue to operate. When the pressure stops, the circuit will be broken and the connected device will be turned off. A tread switch can be made of durable materials such as wood and plexiglass and has a reinforcing clicking sound so the child knows when the switch has been pressed. Project ACTT disseminates a videotape and manual, *Constructing a Battery Interrupter and a Tread Switch,* that demonstrates how to make a simple, inexpensive tread switch.

The Pillow Switch: Another pressure activated switch is the pillow switch. This soft, sensitive switch can be activated by a slight press of a hand, finger, head, or foot. The cover on the pillow can be changed to add tactile or visual stimulus.

The Ribbon Switch: The ribbon switch is a long, flexible band that can be activated by a sweeping motion of the hand or a direct grasp, pull, or push against it. The ribbon switch can also be mounted in wood blocks to provide stability or can be covered with tactilely or visually stimulating materials.

The Mercury Switch: The mercury switch, a versatile switch that can be used with various types of body positions, is often attached to a headband or armband and is activated when mercury moves across contact wires in a capsule. When attached to a headband, the mercury switch can be designed to activate when it moves to the midline or to either side of the midline.

Encouraging independent learning is the goals of any switch activity. Independent learning can be enhanced using switches coupled with software programs and/or modified toys to foster the child's realization that he has impact on or control over his environment. Learning then becomes more enjoyable, and the child develops an eagerness to participate in learning activities. Most importantly, the child and his family realize that his disability need not prevent him from independently impacting his environment.

SWITCH USE

TOPIC: **SWITCH USE**

OVERVIEW: This module provides an overview of the use of switches by young children with handicaps. It demonstrates different types of switches and their use with battery-operated toys and environmental controls.

TIPS TO THE LEADER: This module can be conducted using any variety of switches. The main objective of the module is to show how all switches work to change or control an object. The handouts describe common switches and switch interfaces.

If participants are novices, you might want to allot more time for hands-on activities with switches. This could be a full morning workshop where participants learn to make and use switches.

REQUIRED SKILLS: None

OBJECTIVES:

1. To provide a purpose for using switches with young children
2. To name and operate different types of switches
3. To operate toys and appliances adapted for switch use
4. To name and operate different type of switch interfaces

MATERIALS:

Hardware — for leader and each team:
  Various switches: Plate, flat, mercury, leaf, or others
  Switch toys
  Common household electrical appliances (i.e., blender)
  Various switch interfaces

Handout Packet H-12:
  H-12-1, Commonly Used Switches
  H-12-2, Switch Interfaces

KEY POINTS/ ACTIVITIES:

1. Purpose for using switches with young children

1a. Explain to the participants that switches are tools which increase a child's ability to actively participate in leisure, domestic, vocational, and community activities by controlling electrical toys and appliances with a single movement.

1b. The use of switches helps a child with handicaps participate in his world and control elements of his environment.

1c. When using a switch just like any other educational material, there should be a purpose for its use. For example, one purpose or goal for using a switch toy with a young child, would be to increase that child's attention span.

2. Different types of switches

H-12-1 2a. Distribute *Handout H-12-1, Commonly Used Switches* to each participant. Recommend that participants use this handout to follow along as each switch is introduced. The handout can also be used for note taking and future reference.

2b. Arrange several switches in front of participants. A switch is a device a child uses to control an electronic object. By activating any one of these switches, a child with physical handicaps can learn to control toys or objects in his environment. Any battery-adapted toy can be modified to work with a switch.

2c. Switches are activated by a controlled physical movement. This needs to be a reliable, consistent muscle movement such as the press of a hand, turn of the head or the blink of an eyelid. It is important to assess a child to find which is his most successful movement to make switch use successful.

2d. Select one adapted battery-operated toy and demonstrate the use of different switches with the toy. Identify and discuss each switch as it is introduced. Give the participants an opportunity to use the switches.

2e. Further information on the use of switches can be obtained from switch vendors or special projects (see Reference section).

3. Toys adapted for switch use

3a. Explain to the participants that toys can be permanently adapted for switch use by vendors or by individuals. Refer to the Reference section for more information.

3b. Introduce several toys that have been permanently adapted for switch use. Allow participants an opportunity to use each toy with several switches.

3c. Battery-operated toys can be adapted temporarily or permanently. Using a copper wafer connection, demonstrate a temporary adaptation of a toy for switch use.

4. Switch interfaces

H-12-2 4a. Distribute *Handout H-12-2, Switch Interfaces* to the participants, and explain that a switch interface is a connection between a toy or appliance to a switch. Interfaces can allow several different options for the child.

4b. For example, switches interfaced with a timer allow toys or appliances to stay on for a predetermined length of time once the switch is activated. This may be an important function for children who do not have the necessary motor control or strength to sustain pressure on the switch.

4c. An Environmental Control Unit allows electric devices to be activated by a switch. Common household appliances can be easily adapted for switch use. Any appliance that uses a plug can be used with a switch. Show and demonstrate the use of the Environmental Control Unit with an electrical appliance. Plug the appliance into the unit and plug a switch into the jack on the control unit. Demonstrate the use of the appliance with a switch.

4d. Allow participants an opportunity to operate the timer or Environmental Control Unit with several toys and appliances.

4e. Some switches can be used as input devices for computer programs. In addition, these same switches can be used as an input method to the computer allowing a child to control any software program.

CONCLUSION: This module introduces switches and switch interfaces. Participants are able to operate appliances and toys adapted for switch use.

REFERENCES:

Branderburg, S. A. & Vanderheiden, G. C. (Eds.). (1987). *Communication, control, and computer access for disabled and elderly individuals. Resource Book 2: Switches and environmental controls.* Boston, MA: College Hill Press.

Levin, J. & Scherfenberg, L. (1986) *Breaking Barriers.* Minneapolis, MN: ABLENET.

Levin, J. & Scherfenberg, L. (1987). *Selection and use of simple technology in home, school, work, and community settings.* Minneapolis, MN: ABLENET.

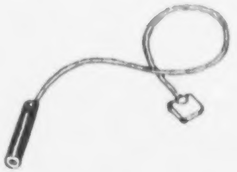
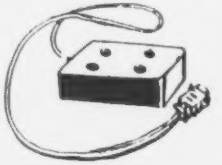
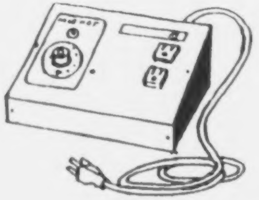
RESNA. (1982). *A guide to controls. Selection, mounting, application.* Washington, DC: Author.

R-12-1, Switch Vendors.

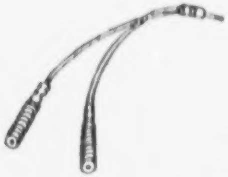
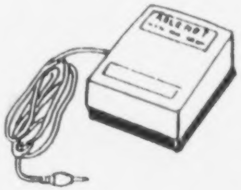
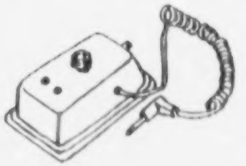
R-12-2, Resources for Adapting Battery Operated Toys.

Source: Preschool Integration Through Technology Systems, (PITTS), United Cerebral Palsy Association of Western New York, Inc., 4635 Union Road, Buffalo, NY 14225; US DOE Grant #H024E80010

OVERVIEW OF COMMONLY USED SWITCH INTERFACES

NAME	EXAMPLE	ACTION IT MODIFIES	COMMENTS	VENDORS
Battery Device Adaptor		Allows a battery operated device to be activated by switch	• non-permanent • can be used with most on/off toys, radios, and tape recorders	Ablenet Don Johnston Kanor
Computer Switch Interface		Allows single switch access to an Apple computer	• accepts 1 or 2 switches • substitutes switches for joysticks	Ablenet Don Johnston TASH
Control Unit		Enables electrical devices to be activated by a switch	• allows children to participate with peers • used with continuous closure or on/off • timer can be set 2 to 90 seconds	Ablenet Don Johnston TASH

Source: Preschool Integration Through Technology Systems, (PITTS), United Cerebral Palsy Association of Western New York, Inc., 4635 Union Rd., Buffalo, NY 14225; US DOE Grant #H024E80010

NAME	EXAMPLE	ACTION IT MODIFIES	COMMENTS	VENDORS
Series Adapter		Connects 2 switches and 1 toy. Both switches must be activated at the same time	• encourages bilateral movement • promotes cooperation between 2 children	Ablenet HCTS Kanor
Switch Latch Interface		Turns the device on and then off with each switch activation	• good for children who are unable to maintain switch closure for a length of time	Ablenet Don Johnston HCTS Kanor
Timer Module		When switch is closed, a toy is activated for a pre-set time	• depending on vendor, toy activates for 1 to 90 seconds	Ablenet HCTS Kanor

Adapted for use from the Technology/Learning/Collaboration Project, Grant #H024C8002288

SWITCH IDEAS

These ideas have been pulled from many different sources. In designing activities that involve switches you are limited only by your imagination. Be creative!

Hook Battery Device Timer (Ablenet) between the switch and the reinforcer. This way the battery-operated toy/tape recorder stays on for a set length of time. This allows a child who cannot sustain pressure on a switch to get reinforced for pushing the switch. This also gives a child more involvement and control over an activity since he/she needs to keep pressing the switch for the activity to continue. They aren't simply watching something that someone else turned on.

The child could use his/her switch and a tape recorder to start songs during music time. Record 15 seconds (or any set amount of time) of each song. Set the Battery Device Timer (if using battery-operated tape recorder) or switch control unit (if using tape recorder that plugs into box) to 15 seconds so that when the child pushes the switch the song starts and the rest of the class joins in. The child does not push the switch again until it is time to sing the next song.

Use the switch-operated drum so the child has an instrument during music time.

When the classroom is making a "band" let the child with the switch and tape recorder start the music and the other children can play along.

Use a switch control unit (Prentke Romich Company, Ablenet, etc.) so small AC appliances can be controlled by a switch. Need to make sure that voltage does not exceed the abilities of the control unit. Blender, blow dryer, radio, small TV, fan, light, tape recorder, mixer, popcorn popper, etc. can be used. Use your imagination! This will allow child to participate in age appropriate activities, help out around the home, help make snack, etc.

During snack time a switch control unit can be used so that the switch controls a blender, mixer, or other small appliance. Let every child in the room use the switch to take turns controlling the appliance.

Other ideas for small appliances and the switch control unit:

- Fan — blow the air at people, blow something up in the air, talk/sing into the fan, hold bubble wand in front of the fan to blow bubbles, tie colored streamers onto the fan
- Colored lights, Lite Brite, Light box, Christmas tree star
- Blow dryer — play game of blowing cotton balls/ping pong balls across the table, blow air at people, toy boats across water, pinwheels, target shoot
- Radio, small TV, small vacuum cleaner, almost any small appliance will work

Record directions for Simon Says on a tape. Make each direction be a set amount of time (such as five seconds). Set the switch timer for five seconds. Then when the child presses the switch a direction is given to the class.

Patti J. Place, M.A., CCC-SLP

Family Child Learning Center, Tallmadge, OH 633-2055

3/20/91

Stories recorded on cassette tapes (either purchased or recorded by a family member) can be used for recreation/leisure.

Switch can be used to control a battery-operated Spin Art during art activities.
Make spin art notecards
Paint on leaves
Put glue on paper and drop glitter or pieces of tissue paper while it is spinning

Use the Spin Art for a spinner for a game — put numbers or colors on an overlay and attach a pointer to the spin art. The child moves the number of spaces shown or to the color that was highlighted.

Some games which are battery-operated may be very appropriate to make switch operable such as Bed Bugs.

The child's teacher can record messages about the child's day for he/she to "tell" the family at home. Parents can record messages for the child to "tell" the teachers and children at school.

Child could press a switch to turn on a light or make a sound to signal the start of a race.

Use switch with a slide projector. Each switch press advances the carousel one picture. Could be used for recreation/leisure, to show slides for show and tell, for group learning activity, etc. Slide projector adaptor available through Ablenet.

Child can use the switch, Battery Device Timer, tape recorder, and an answering machine loop tape for communication. Record a message on the tape and put a picture corresponding to the message on/near the switch. Messages could be:

"Come here" — to request attention
"More please" — to request more food, actions, toys
"Help"
"I'm finished"
"My turn"
Anything appropriate to a situation

Think creatively about activities you can do with a toy rather than just letting the child sit there and watch the toy go:

Car/Truck	Drive into the garage (shoe box) Knock down a wall/tower of blocks Deliver or pick up small toys or snacks
Kitty	Walk to food Crawl under a blanket Kick the blanket off Walk off of the table
Crawling Baby	Crawl to bottle to eat, book to read, blanket to sleep, etc. Have a baby race with two crawling babies

Have two children with toys and switches. Let the toys "chase" each other.

For outdoor summer play get a battery/switch-operated squirt gun (Handicapped Children's Technological Service makes a squirt gun and an elephant that shoot water *30* feet).

At Halloween — create a switch-controlled haunted house. Children use switches, tape recorders, switch control units to control the lights, scary noises, and scary music.

For musical chairs allow the child using a switch to control the music.

Use toys appropriate to the unit or theme the class is working on so that the toys are related to ongoing activities.

Have the student use a switch and tape recorder to give the directions/explanation for an ongoing activity. (I know of a student who did this to describe the magic trick she was doing as part of the school magic show.)

Barrett School has developed a switch-operated bowling ramp. Barrett School is in Akron, Ohio.

LEVEL: STAFF

GOAL: #2 Become familiar with switch application as a means of allowing young children with disabilities greater opportunity for independent control and participation.

COMPETENCY TYPE: SKILL

OBJECTIVE: Participants will operate toys and appliances adapted for switch use and identify resources for these materials.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
1. Individual or small group activity Give participants the opportunity to use the various switches, switch interfaces, toys, and appliances.	1. Various switches: plate, flat, mercury, leaf, or others (available from SERRC or ORCLISH). Various switch interfaces (also available from SERRC or ORCLISH). Common household electrical appliances (tape recorder, fan, blender). Switch toys (permanently and temporarily adapted). If resources are available: Computers, switches, switch interfaces, and single-switch software.	1. If possible, obtain toy(s) that would be of greatest interest to young children, such as: – Plush Fancy Feet Caterpillar that walks, with eyes/antennae that light up. – Robot that walks with moving arms and eyes that light up. – Plush Pig that walks with sound and wagging tail. – Climbing Fireman.
2. Large group activity Provide Handout S-H6 listing sources for obtaining these materials.	2. Handout (S-H6) *Switch Resources*	2. This opportunity for participants to experience the increased opportunities created through switch activation will be *greatly* enhanced if you include at least one computer equipped with a switch, switch interface, and piece(s) of single-switch software.

SWITCH RESOURCES

Don Johnston Developmental Equipment, Inc.
P.O. Box 639
1000 N. Rand Road, Building 115
Wauconda, IL 60084
800/999-4660 or 708/526-2682

Zygo Industries
P.O. Box 1008
Portland, OR 97207
800/234-6006 or 503/297-1724

Linda Burkhart
8503 Rhode Island Avenue
College Park, MD 20740

ABLENET
1081 10th Avenue S.E.
Minneapolis, MN 55414
612/379-0956 or FAX 800/322-0956

ComputAbility Corporation
40000 Grand River, Suite 109
Novi, MI 48375
800/433-8872

Creative Switch Industries
P.O. Box 5256
Des Moines, IA 50306
514/287-5748

Tapeswitch Corporation
100 Schmitt Blvd.
Farmingdale, NY 11735
516/694-6312 or FAX 516/694-6304

Prentke Romich Company
1022 Heyl Road
Wooster, OH 44691
800/642-8255 or 216/262-1984
(Ohio residents call collect)

TASH, Inc.
70 Gibson Drive, Unit #12
Markham, Ontario L3R 4C2
Canada
416/475-2212 or Telex 06-986766 TOR

Asahel Engineering, Inc.
N.E. 820 California Street
Pullman, WA 99163
509/332-2205

Toys for Special Children, Inc.
(Steven Kaynor)
385 Warburten Avenue
Hastings-on-Hudson, NY 10706
914/478-0960

Regenesis Development Corporation
1046 Deep Cove Road
North Vancouver, BC V7G 1S3
Canada
604/929-2414

Adaptive Equipment for the Handicapped
P.O. Box 496
Ocean Park, ME 04063-0496
207/934-2952

DU-It Control Systems Group, Inc.
8765 Twp. Rd 513
Shreve, OH 44676-9421
216/567-2906

Behavioral Engineering
230 Mt. Herman Road
Scotts Valley, CA 95066
408/438-5649

Adaptive Communication Systems, Inc.
Box 12440
Pittsburgh, PA 15231
412/264-2288

Arroyo & Associates, Inc.
2549 Rockville Center Parkway
Oceanside, NY 11572
516/763-1407

KY Enterprises/Custom Computer Solutions
3039 E. 2nd Street
Long Beach, CA 90803
213/433-5244

Technology for Language and Learning
P.O. Box 327
East Rockway, NY 11518-0327
516/625-4550

Luminaud Switches
8688 Tyler Blvd.
Mentor, OH 44060

Source: Building ACTTive Future, ACTT's Curriculum Guide for Young Children and Technology. Macomb Projects. College of Education, Western Illinois University, Macomb, IL 61455.

LEVEL: STAFF

GOAL: **#2** Become familiar with switch application as a means of allowing young children with disabilities greater opportunity for independent control and participation.

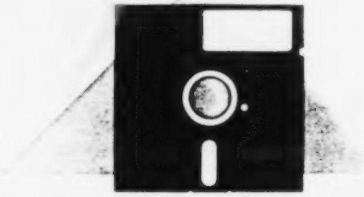
COMPETENCY TYPE: VALUE/ATTITUDE

OBJECTIVE: Participants will identify positive benefits of switch use for children with physical or cognitive limitations.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
1. Large group activity Review with participants that switches are tools which allow a child with a physical or cognitive disability to actively participate in leisure, domestic, vocational, and community activities by controlling toys, appliances, or a computer with a single movement.		
2. Large group activity Ask each participant to identify a young child with special needs. Determine an activity in which that child is currently unable to participate. Have participants suggest possible switch applications that would facilitate participation. Discuss the individual benefits that may derive from switch use. List them on a Flip Chart to illustrate the many ways that the child will benefit. The leader should be sure to discuss benefits such as greater independence, heightened self-esteem, increased social opportunities, ability to participate in more activities, etc.	2. Flip Chart and large colored marker	2. See Handout S-H3, *Switches* and Handout S-H5, *Switch Ideas* for references to these concepts.

GOAL 3

Technology



LEVEL: STAFF

GOAL: **#3** Gain introduction to basic use of computer and peripherals with young children who have disabilities.

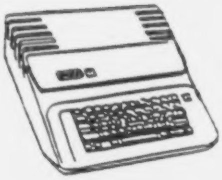
COMPETENCY TYPE: KNOWLEDGE

OBJECTIVE: Participants will learn that the computer and peripherals can be used in various ways to meet the individual needs of young children with special needs.

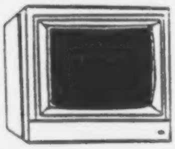
ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
1. Large group activity Using Handout S-H7, *The Computer System: Standard Components* as a reference, review the basic components of the computer system. If audience has little or no experience with Apple II computers, leader may review *briefly* general concepts covered in Leader Notes.	1. Handout (S-H7) *The Computer System: Standard Components* Leader Notes (S-L1-6) *Introduction to the Computer System* (training module from PITTS) *Glossary* (of Computer Terminology) *Computer Tips** *Starting Up a Software Program** *Caring for Disks** *The Adaptive Firmware Card*	1. For more in-depth general information on the computer, leader can refer to the following items in the Leader Notes: *These may be appropriate also as Handouts if audience does not have experience with Apple II computers.
2. Explain that it is the input of information by the standard keyboard that causes young children problems. Small hands have a hard time reaching and typing keys. Young children are usually non-readers and non-typists which also makes the keyboard inappropriate. Young children with physical or cognitive limitations may display even stronger needs for an alternate means of input.		
3. Large group activity Show the video *Adapting the Computer.*	3. Video *Special Friends and Computers: Adapting the Computer* This video is from PITTS and will probably be available at your local SERRC.	3. Point out various peripherals as they are shown in the video. Ask participants to identify specific advantages that appear to provide young children in providing access to the computer.

S-H7

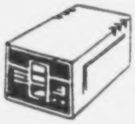
THE COMPUTER SYSTEM STANDARD COMPONENTS



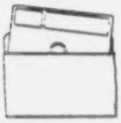
The **COMPUTER** is the processing unit, memory, and power supply source of the computer system. It is also referred to as the Central Processing Unit (CPU).



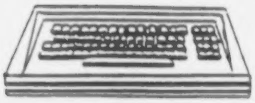
The **MONITOR** provides a visual display of the information being processed by the computer. The information can be words or pictures. Color monitors are suggested for use with preschoolers. The monitor attaches to the computer with a video cable. Unlike televisions, sound is not controlled through the monitor; it provides video output only.



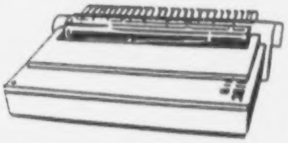
The **DISK DRIVE** is a device that reads the program information stored on a disk. After a disk is inserted and the power turned on, the disk drive loads the program into the computer's memory so that it can be used.



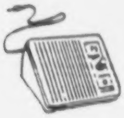
The **DISK** is a storage medium of programmed information. It is the software program that the computer reads and responds to.



The **KEYBOARD** is the standard input device similar to a typewriter, which sends information to the computer by typing letters, numbers or commands. Keyboards can be built into the computer console (Apple IIe) or attached to the computer with a cable (Apple IIGS).



The **PRINTER** is a device which produces paper or a "hard" copy of the information developed using the computer. Several preschool programs offer a color print-out option; a special printer and color ribbon is required. The printer connects to the computer through an interface card and cable.



The **ECHO SPEECH SYNTHESIZER*** is a device which connects to the computer with an interface card and cabled speaker. It provides speech output for programs specifically designed to work with the Echo.

*The Echo Speech Synthesizer is not a standard component of the computer system. However, it is highly recommended to be used with preschoolers, to enhance their software programs.

Source: Preschool Integration Through Technology Systems, (PITTS), United Cerebral Palsy Association of Western New York, Inc., 4635 Union Road, Buffalo, NY 14225; US DOE Grant #H024E80010.

INTRODUCTION TO THE COMPUTER SYSTEM

OVERVIEW: This module provides an introduction to computers and related components. Specifically, participants learn to recognize standard input and output components of the computer and are introduced to alternate input devices and enhancements. Sections on care, maintenance, and efficient use of the computer system are included.

TIPS TO THE LEADER: As this is a basic introduction to the computer, it can be used as a precursor to any of the following technology modules. It is designed for the novice. The length of time suggested for this module does not include time for participants to start up software independently. You may want to lengthen the module depending on the needs of your audience. If the majority of the participants are extensive computer users, this module may be introduced as a reference module. The booklet, found in Appendix B, provides the structure of the module and is entitled "An Introduction to the Computer System". This booklet is a great resource to utilize when training others. It should be distributed to all participants either novice or user level.

REQUIRED SKILLS: None

OBJECTIVES:

1. To define components of the standard computer system
2. To define alternate input devices
3. To illustrate connector areas on the computer
4. To list methods to use in caring for disks
5. To demonstrate steps necessary to start up a software program
6. To list ways to care for the computer system
7. To list suggestions for tips on organization, software, and hardware use

MATERIALS:

Hardware — for leader:
- Apple IIe Computer system with color monitor and printer
- Echo IIb Speech Synthesizer
- Touch Window
- Power Pad
- Switch

Software — for leader:
- Preschool software program

Handout Packet H-6:
- (Appendix B)
- Booklet: An Introduction to the Computer System

KEY POINTS/ ACTIVITIES:

1. Standard computer components

1a. Point to the computer system and explain that the Preschool Integration Through Technology Systems (PITTS) Training centers around the use of Apple computers. These computers are recommended for several reasons:

- They are easy to adapt to the needs of young children with physical handicaps.
- The majority of preschool software is currently designed for Apple computers.
- Apple computers are the most frequently used computer model in the elementary school setting; a setting which these preschoolers will soon enter.

Appendix B

1b. Distribute booklet found in Appendix B, *An Introduction to the Computer System,* to the participants. Recommend that they use it for future reference. Explain and demonstrate that the booklet contains information on standard computer components and alternate input devices, along with other helpful information. The use of devices is explained in full during future modules. The purpose of this session is to provide a general overview of the computer.

1c. Using the computer system for demonstration, point out the various standard components and describe them by using the booklet information as a guide. The standard components include: the computer (the central processing unit), monitor, keyboard, disk drive, disk, and printer.

1d. Point out to the participants that the Echo Speech Synthesizer is not a standard part of the computer. It is an enhancement which is recommended as an integral component in computer use with young children with handicaps and their non-handicapped friends.

2. Alternate input devices

2a. Explain to the participants that it is the input of information by the standard keyboard that causes young children a problem. Small hands have a hard time reaching and typing keys. Plus, young children are often nonreaders and non-typists, which makes the keyboard an inappropriate choice for them. Fortunately, there are many ways to adapt the computer to make it easier.

2b. With two or three different devices available for demonstration, explain that these alternate input devices help to provide successful computer experiences for young children. The following devices, plus others, are described in the booklet.

- Touch Window: This device mounts onto the monitor. A child simply touches the screen to use the software program.
- Power Pad: The surface of this device changes with each piece of software. Show different overlays and explain that the press areas are defined for each program.

- Switch: This device is used by very young children and people with physical disabilities. A single press permits the user to run a software program.

2c. Remind the participants that all of the input methods shown in this module are discussed at length in separate modules.

3. Computer connection areas

3a. Explain to the participants that these input devices and computer enhancements, such as the Echo Speech Synthesizer, must be connected to the computer in some way. There are several ways to do this. This information is clearly illustrated in the booklet as part of each device description.

3b. Assemble the participants around a computer (CPU) to demonstrate the connector sites. Explain that there are two I/O (in/out) ports found on the Apple computer. Several devices plug into these ports.

3c. Turn the computer around and locate the 9 pin I/O port on the back of the computer. Explain that devices such as joysticks and the Touch Window connect here. Demonstrate the plug-in using one of the devices.

3d. Explain that another port is used for devices with 16 pin heads, such as the Power Pad or Koala Pad. This 16 pin I/O port is found inside the computer. Reassure the participants that this information is clearly illustrated in the booklet.

3e. Take the top off the computer. Locate the 16 pin I/O port on the upper right corner of the motherboard. Show a cable with a 16 pin head to the participants and explain that an extender port can be used so that you don't have to open the computer each time you want to use the Power Pad.

3f. With the computer open, point out other parts of the computer: the motherboard, power supply box, and the seven expansion slots.

3g. Explain that these expansion slots can be used for additional enhancements to the computer. A circuit card is placed in a slot so as to use the capabilities of the computer. Describe and demonstrate available cards and their functions or use the following as examples:

- For the printer to receive directions from the computer, a circuit card is added to slot one. A cable then connects the printer to the card.
- The Echo Speech Synthesizer is a circuit card and speaker system. The card is inserted into an expansion slot and the speaker box is attached to the card with a cable.
- Other cards can be used for extending the memory of the computer, modem use in transferring information over telephone lines, or adding other input devices that do not plug into one of the ports (light pens, mouse, etc.).

3h. Replace the top of the computer. Tell the participants that they will have the opportunity to plug in devices and install circuit cards during other modules.

4. Caring for disks

4a. Demonstrate a disk to the participants. Remind them that the disk is what provides the versatility to the computer. Information that the computer will use is stored on the disk. Point out the shiny film and explain that the information (data) is stored on the surface of this magnetically coated film. A vinyl covering called a "jacket" protects the film.

4b. Suggest that the participants find the section in the booklet entitled "Caring for Disks." Discuss each point. Field any questions.

5. Starting up a software program

5a. With the participants seated in front of the computer system, explain that steps necessary to start up a software program will be demonstrated. This is a review for individuals who have used software prior to this training.

- Make sure the computer is off.
- Remove the disk from the paper envelope by holding the label end.
- Slowly insert the disk into the disk drive and close the door.
- Turn on the computer, either by turning on the computer and monitor separately, or by activating the switch on the surge protector.

5b. Explain that this process is also know as "booting" a disk.

6. Caring for the computer system

6a. Explain that the computer system is a rugged machine that should provide years of service. Careful use and regular maintenance can extend the life of any machine.

6b. Instruct the participants to find the section in the booklet entitled "Caring for the Computer System". Review and discuss each point. Ask participants for other suggestions. Field any questions.

7. Helpful hints

7a. Explain that there are several additional pieces of information to know when using computers. The "hints" listed in the booklet under "Computer Tips" are grouped under three categories and are the result of a survey of a variety of computer users. The three categories include: organization, software, and hardware.

7b. Instruct the participants to locate the section in the booklet. Discuss each point, and ask the participants for other suggestions. Field any questions.

CONCLUSION: This module provides an overview of the computer system. The Apple computer's adaptability and wealth of software makes it an ideal choice for use with young children with handicaps and their non-handicapped friends.

Source: Preschool Integration Through Technology Systems, (PITTS), United Cerebral Palsy Association of Western New York, Inc. 4635 Union Rd., Buffalo, NY 14225; US DOE Grant #HO24E80010

GLOSSARY

This glossary contains terms used frequently in relation to computers. Knowledge of computer terminology leads to a better understanding of computer literature and improves communication with others in the field.

Adaptive Firmware Card: The Adaptive Firmware Card is a multipurpose peripheral card which allows for modification of the method of input and rate of presentation for many commercial software packages. A primary function of the Adaptive Firmware Card is to enable individuals for whom the computer's keyboard is inappropriate to use commercial software with a single switch. In addition, it allows for other methods of input including scanning, Morse code, and adaptive keys.

Adaptive Keyboard: Adaptive keyboards are generally attached to the computer with firmware cards. These keyboards are usually programmable and enable the user to send information to the computer in different forms. For instance, one key can be the equivalent of an entire word or phrase or representative of a functional command.

Backup: A backup is a duplicate made of a disk/file and kept on hand to avoid the loss of or damage to crucial data. It is highly recommended that backup copies be made for heavily used or favorite programs while the originals are kept on file.

Boot: The process of turning the computer on and loading a program into the computer's memory is known as a "boot." Reference is sometimes made to "cold or warm boots." A cold boot is performed when a program is loaded by turning on the computer. A warm boot is done by clearing one program from memory and loading another without turning the computer off.

Bug: An error in a computer program which keeps the program from running correctly.

Byte: A series of eight bits that represents a character, instruction, letter, or number to the computer as a unit of measure for computer memory.

CD ROM: Information is permanently burned into a disk using laser beams. A mold is made from a master disk and plastic copies are duplicated from the mold. The disks, about 4¾" in diameter, are read by a laser beam in a CD-ROM drive that is attached to the computer. Because you cannot erase information on a CD-ROM disk, it is ideal for storing databases and other large amounts of information.

Central Processing Unit: The CPU is the main brain of the computer. It is the unit in the computer that processes data, stores data, and retrieves data from memory. When the CPU consists of only one chip, it is called a microprocessor.

Character: A character refers to any letter, punctuation mark, space, or digit used to represent information.

Chip: A chip is an integrated circuit containing microscopic switches etched in a small piece of silicon. These chips carry out the processing of data. Chips may hold data permanently or temporarily. They often look like thin, black rectangular boxes with spike-like connectors coming out of the bottom. They either plug into or are soldered into the circuit boards of the computer.

Click: To position the pointer on an object on the screen, then press and quickly release the mouse button.

Clipboard: The holding place for information that was last cut or copied; a buffer area in the computer's memory.

Computer Assisted Instruction (CAI): CAI refers to instruction which is conducted or augmented by a computer. CAI software includes drill and practice, tutorials, simulations, problem solving, and educational games.

Computer Managed Instruction (CMI): CMI is intended to make instruction management and record-keeping easier and more efficient. These are teacher-oriented rather than student-oriented programs. For example, the computer might keep records, test results, and progress reports; the computer might generate materials (IEPs) or test students and prescribe appropriate work.

Crash: A crash occurs when a program quits working as it should or the disk is damaged. Most often a crash is permanent damage to the data on a disk, but in some instances it can be a temporary problem due to static or incorrect disk drive speed.

Cursor: A cursor is a small, often blinking, symbol which appears on the monitor. It indicates that the computer is waiting to receive information.

Daisy-chain: To connect a series of peripherals (e.g. disk drives) to the computer. The first is connected directly to the computer; the second is connected to the first, and so on.

Debugging: Debugging is the process of looking for and removing the bugs or errors from a computer program.

Disk: A disk (also known as a diskette or floppy disk) is a piece of magnetic storage material similar to recording tape. It is enclosed in protective covering and is used to store computer programs or data. A 5.25" disk has the storage capacity of 143K (or about 70 pages of text). A 3.5" disk has the storage of 800K (or about 400 pages of text).

Disk Drive: A drive is a mechanical device that stores information on and retrieves information from a disk.

Disk Operating System (DOS): This program informs the computer how to use a disk. It tells the computer how to distribute information on the disk and how to read information from the disk.

Documentation: Documentation refers to the instructions or manual which accompanies commercial software programs.

Expanded Memory: Expanded memory refers to added memory, which gives more RAM storage to the computer. (see **Memory, RAM, ROM**)

Firmware: Sometimes considered "hard software," these chips can be found on firmware cards placed in the expansion slots of the logic board. Firmware contains instructions in ROM to operate peripheral devices (e.g. speech synthesizers).

Firmware Card: (see **Interface Card**).

Game Port: (see **Port**).

Graphics or Touch Tablets: Input devices that transfer an image created on a touch sensitive workspace to the computer monitor. A software program and stylus accompany this flat, tracing pad type peripheral. Some instructional software is also available and requires the user to press an area on the pad to operate the program. The area is usually defined with an overlay which is placed over the activation area of the touch tablet.

Hard Copy: A printed copy of the computer program or text.

Hard Drive: A hardware device installed inside or outside of a computer which can store very large amounts of information. Commonly 10MB, 20MB, 40MB, or 60MB.

Hardware: Hardware refers to the electronic and mechanical components which make up the computer system. These usually include the computer, monitor, disk drive, and printer.

Hypercard: This complete visual information center allows you to customize, organize, retrieve, and deliver information. Like a Rolodex card system, one single card contains a set of specific information. Using hypercard they can be combined to create stacks which can contain text, sound, and graphics.

Hypermedia: Software developed by an author or publisher using hypercard functions that gives you ready made hypercard applications. (e.g. **Hyper Studio**).

Icon: (1) A graphic symbol on the back panel of the computer or its connecting cables which indicates where a device is to be connected. (2) In mouse-based applications, a graphic symbol on the screen that represents a disk, a document or file, or anything that can be selected.

Initialize: Initializing (formatting) electronically divides the disk into sectors and tracks which the computer uses for areas of data storage. When a disk is initialized or formatted, it is prepared to receive data. Caution should be used when initializing a disk since any information already on the disk being initialized will be erased.

Input Device: An input device is a component or peripheral which allows the user to enter information into the computer. The most common input device is the keyboard. Alternative input devices include switches, touch tablets, joysticks, paddles, and adaptive keyboards.

Interface: A device which allows the computer to communicate and work with another device (such as a printer). The term also refers to the physical place where the two are connected.

Interface Card: A circuit board which is inserted into one of the expansion slots of the computer which enhances the capabilities of the computer (for example: FingerPrint®, Adaptive Firmware Card™, or Echo™).

Joystick: Commonly used for games, this input device has a control stick and two buttons. Rotating the stick moves the cursor (or action figure) in a 360 degree circle. The buttons can be used to control other features of the program.

K: In reference to computers, K stands for kilo or 1000 (actually 1024) units of memory/storage. These units are counted in bytes; therefore, a computer of 64K has the storage area for 64 kilobytes of data.

Keyguard: A device that covers the keyboard and allows the users to move their hands over the surface without accidently activating the keys. The keyguard also provides direction for a finger or prod.

Language: A programming language is a set of commands which can be used to instruct the computer to perform specific tasks. Three of the most popular languages used in education are BASIC, Pascal, and LOGO.

Logic Board: This is the main circuit board in a computer and is sometimes called the **Mother board**. It contains the central processing unit (CPU), RAM, ROM, and other specialized chips and circuitry.

Medium or Media: Any material which can store data and/or programs can be called a medium. Examples include disks, punched cards, and cassettes.

Megabyte: A unit of measure for computer memory. One megabyte equals 1,048,576 bytes or characters.

Memory: Chips in the computer which have the capacity to store information. (see **RAM** and **ROM**)

Modem: A modem is a peripheral device which allows a computer to transmit and receive data from another computer over telephone lines. The word modem is derived from the words MOdulate/DEModulate.

Mouse: A computer device that controls the pointer on the screen. Rolling the mouse on a flat surface next to the computer causes the pointer to move correspondingly. The button on the mouse is used to select an icon or a computer function from the menu.

Output Device: Output devices, including monitors, printers, speech synthesizers, and robots, receive information produced by the computer and make it available to the user in an understandable form.

Paddles: Paddles are input devices which operate by turning one or both dials or by pressing the buttons. Often used for games, one dial moves the cursor (or action figure) horizontally and the other vertically. Some programs require the user to control the action using only the buttons.

Peripheral: A hardware device which is outside of, but connected to, the computer is called a peripheral. These include input and output devices such as joysticks, paddles, graphics or touch tablets, adaptive keyboards, printers, speech synthesizers, and robots.

Port: A socket on the back panel or on the logic board of the computer for connecting peripheral devices.

Printer: An output device for printing data onto paper. There are several types of printers. A dot-matrix printer is an impact printer which prints characters and graphics composed of dots. A daisy wheel printer is a letter quality, impact printer which prints pre-formed characters that are located on a printwheel or ball. A laser is a non-impact printer which uses a laser to make high-quality impressions.

Program: A program is a set of instructions, written in a language the computer understands, which allows the computer to perform a function or task.

Public Domain Software: Software that is not copyrighted.

Random Access Memory (RAM): A temporary storage area for programs and data. This information can be easily altered or deleted. When the computer is turned off, this information is erased. Therefore, data of this sort is stored on disk or cassette and retrieved when needed.

Read Only Memory (ROM): This information is stored permanently and remains available for the computer to use. It may not be altered or erased. It usually includes operational instructions for the computer such as the program to boot the computer and a computer language such as BASIC. This information is not lost when the computer is turned off.

Scanning: To automatically step through allowable responses which users select by activating a switch.

Shareware: Public domain software you can try out. If you like it and decide to use it, you send a donation or stipulated fee (usually small) to an address indicated in the program.

Slot: A long, narrow, numbered (1-7) socket on the logic board of the computer where interface cards are inserted.

Software: The programs used by the computer. Programs on both 3.5″ and 5.25″ disks are referred to as software.

Speech Synthesizer: Speech synthesizers are output devices which enable computers to "speak" by converting text characters into artificial speech.

Switch: A hardware device used in place of the standard keyboard that allows people who have little motor control to use the computer.

Switch Interface: Hardware that allows the switch to be connected to the computer.

Text-to-Speech: Speech output equipment that will pronounce whatever text is input.

Touch Tablet: A flat-surfaced input device. By touching the surface, the users generates input to the computer.

Word Processing: Writing, editing, formatting, and printing of text and documents on a computer system. These programs allow for easy insertion, deletion, and movement of text which permits full revision and print out in a short time.

Write-Enable: There is a small notch in the upper-right corner of a 5.25″ disk. If the notch is uncovered, the disk is write-enabled and the user is able to add to, delete, and change information stored on it. On a 3.5″ disk, the disk is write-enabled when the small piece of plastic covers the square hole in the upper-right corner.

Write-Protect: Changes cannot be made to the information stored in a write-protected disk. To prevent changes to the contents of a 5.25″ disk, cover the notch. Slide the small plastic tab to uncover the square hole on a 3.5″ disk to write-protect it.

Source: Building ACTTive Futures, ACTT's Curriculum Guide for Young Children and Technology. Macomb Projects. College of Education. Western Illinois University, Macomb, IL 61455

COMPUTER TIPS

ORGANIZATION

Software programs are stored on a disk and can be susceptible to damage. Take time to back up or duplicate your disk in case it is destroyed. Every disk should be backed-up to protect your software.

Copyright laws allow you to have one back-up copy of any computer program that you purchase. If you can't make a copy, contact software publisher and ask about their replacement policy.

Consult your computer Owner's Manual on copying disks. Make sure to format or initialize a blank disk before you begin. There are also commercial software programs made for this purpose.

Store the original disks in a separate case from the copies that are used.

Label each disk precisely with program, publisher, and date.

SOFTWARE

Store disks in a dust proof container that provides for ultraviolet screening.

The **RETURN** key may be required after a key selection, for an "entry" command.

The **ESCAPE** key often takes you back to the main menu.

Make sure that the **CAPS LOCK** key is down when using most software programs.

To start a disk with the power on; insert a disk into the drive and press the keys **Control/Open Apple/Reset,** all at the same time.

HARDWARE

Make sure the power is off when connecting or removing peripherals.

Only one alternate input device should be connected to the computer at one time.

When adding circuit cards or connecting peripherals to the inside of the computer, make sure to touch the power supply box before you begin.

If you are having trouble with the computer working properly, check that all the connections are secure (wall circuit, monitor, printer, peripherals, etc.).

Turn off the computer when it is not in use.

Source: Preschool Integration Through Technology Systems, (PITTS), United Cerebral Palsy Association of Western New York, Inc., 4635 Union Road, Buffalo, NY 14225; US DOE Grant #H024E80010

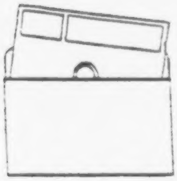
S-L4

STARTING UP A SOFTWARE PROGRAM

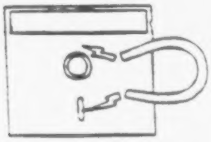
1. Make sure the computer is off.
2. Remove the disk from the paper envelope by holding the label end.
3. Slowly insert the disk into the disk drive and close the door.
4. Turn on the computer.

Source: Preschool Integration Through Technology Systems, (PITTS), United Cerebral Palsy Association of Western New York, Inc., 4635 Union Rd., Buffalo, NY 14225; US DOE Grant #H024E80010

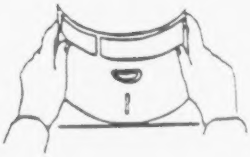
CARING FOR DISKS



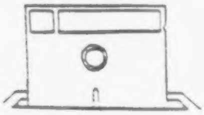
Store the disk inside the paper envelope or sleeve and then place them in the dust free container vertically.



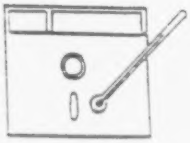
Keep your disks away from any source of magnetism like a stereo, TV, a household appliance, and even the top of the disk drive. Data is stored on the surface of magnetically coated film under the jacket of the disk.



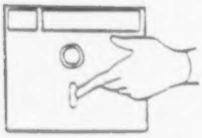
Handle the disk carefully. Bending the jacket may cause damage to the disk. Do not use paper clips on the disk.



When inserting the disk into the disk drive, be sure to put it in straight. Rough treatment can cause damage to the jacket or the disk.



Store the disk away from direct sunlight, moisture, and extreme temperatures.

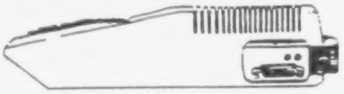


Fill out the labels for the disks before you place them on the disk itself. Do not touch the disk where the jacket does not protect it. Always handle and hold the disk by the label.

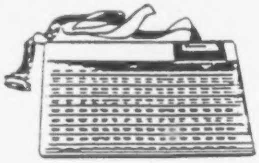
Source: Preschool Integration Through Technology Systems, (PITTS), United Cerebral Palsy Association of Western New York, Inc., 4635 Union Road, Buffalo, NY 14225; US DOE Grant #H024E80010.

THE ADAPTIVE FIRMWARE CARD
INPUT DEVICES

There is a wealth of preschool software designed for the standard keyboard that will not work with the Touch Window, Power Pad, Muppet Learning Keys, or a joystick. In order for preschoolers with handicaps to use these software programs with input devices that are more successful for them, the computer itself must be modified. By adding the Adaptive Firmware Card (AFC) to the computer, the following devices can be used with any software program designed for the keyboard.

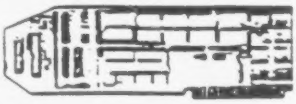


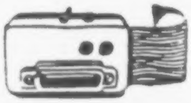
The **ADAPTIVE FIRMWARE CARD** is installed in the computer. Its control box attaches to the card and is used outside the computer as a plug-in port for the following input devices.



The **UNICORN BOARD** is a touch sensitive keyboard which allows users to customize overlays for individual software programs using pictures to indicate the correct key to select. Press areas can be large or small and positioned anywhere within the surface of the board.

NAME: **ADAPTIVE FIRMWARE CARD**





MANUFACTURER: Don Johnston Developmental Equipment, Inc.
P.O. Box 639
1000 N. Rand Road, Bldg. 115
Wauconda, IL 60084
(312) 526-2682

DESCRIPTION: The Adaptive Firmware Card System consists of an internal printed circuit card and an I/O box. The system allows a computer to be accessed transparently by any one of 16 special input methods for people who cannot use the standard keyboard or who find an alternate input method more efficient. To use the Adaptive Firmware Card System, you need an input device (such as an expanded keyboard or switch) which you must purchase from another source.

REQUIRED SOFTWARE:	The first time you install the Adaptive Firmware Card, you must use a special piece of software (included with the system) which sets up the system and tells the computer which input device you will use and its special input method. This set up allows the user to run commercial software with special input methods and rates.
CONNECTION:	The circuit card fits into one of the expansion slots inside the computer. No technical expertise is required for installation. The I/O box easily mounts on the side of the computer. The switch or other input device (supplied by the user) plugs into this I/O box.
COMPUTER:	Models are available for Apple computers.
APPLICATIONS:	The Adaptive Firmware Card enhances the computer and allows transparent access to most software. The user can select any one of sixteen input methods depending on his or her physical ability and the type of access device. Input methods range from alternative keyboards, scanning for switch use, to morse code. The card can also slow down the response time required in interactive programs. It also permits the computer to be used as a rudimentary communication device.
PHYSICAL ABILITY:	Depending on the access device used, almost any degree of pressure can be selected.
PRICE:	Apple IIe with 64k (C40) $400.00, Apple IIgs (G32e) $520.00

Source: Preschool Integration Through Technology Systems, (PITTS), United Cerebral Palsy Association of Western New York, Inc., 4635 Union Rd., Buffalo, NY 14225; US DOE Grant #H024E80010

LEVEL: STAFF

GOAL: **#3** Gain introduction to basic use of computer and peripherals with young children who have disabilities.

COMPETENCY TYPE: SKILL

OBJECTIVE: Participants will identify computer components and peripherals.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
1. Large group activity Using Handouts S-H8, 10, 12, 14, 16, and 17, briefly discuss the use of each peripheral. Point out the connections on the computer. Make participants aware that Handouts S-H9, 11, 13, and 15 are resources for their future reference, providing specific information about installation and purchase.	1. Handouts (G-H8-17) *Touch Window* *Touch Window: Installation and Resources* *Power Pad* *Power Pad: Installation and Resources* *Muppet Learning Keys* *Muppet Learning Keys: Installation and Resources* *Echo Speech Synthesizer* *Echo Speech Synthesizer: Installation and Resources* *Unicorn Expanded Keyboard* *Keyboard Modifications*	1. As each peripheral is discussed, specifically point out some ways a child with a disability would benefit. Although these peripherals may have their most direct benefit for children with physical limitations, they can benefit all young children because of their concrete nature and simplicity of use. Try to point out that children with learning or developmental disabilities can also gain more appropriate access to the computer with the use of these peripherals.
2. Individual or small group activity Let participants try using peripherals with selected software at computer stations that have been set up for their use. Encourage participants to rotate from station to station.	2. Set up three or four computers, or as many as possible. Each computer should have one of the peripherals connected and a piece of software loaded. Following are some suggested applications. a. *Touch Window* - Use software that comes with the Touch Window or any Muppet Software. (Remember to set the program for Touch Window at the beginning.) Or use Balancing Beam, Creature Chorus, or other preschool software that you have that works with Touch Window. b. *Power Pad* - UCLA Software - Buddy's Body, Old McDonald's Farm, Paper Dolls - or what you may have.	2. Leader should emphasize that trying the peripherals at the various stations is an *awareness activity.* Participants are not expected to become confident hands-on users! If possible, Unicorn Expanded Keyboard can be displayed, but there will not be enough time for hands-on time with this equipment. In "Supplemental Resources for Goal 3," see *The Adaptive Firmware Card Devices* and *The Adaptive Firmware Card* for further information.

LEVEL: STAFF *(continued)*

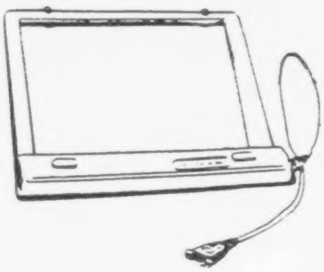
GOAL: #3 Gain introduction to basic use of computer and peripherals with young children who have disabilities.

COMPETENCY TYPE: SKILL *(continued)*

OBJECTIVE: Participants will identify computer components and peripherals.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
	c. *Muppet Learning Keys* - Sunburst Muppet Series, Action Music Play - Peal Software. d. *Echo Speech Synthesizer* - You don't need to set up a separate station, because this can be installed and demonstrated with Touch Window, Power Pad, or Muppet Learning Keys.	

NAME:	**TOUCH WINDOW**



MANUFACTURER:	Edmark Corporation P.O. Box 3903 Bellevue, WA 98009-3903 (206) 746-3900 (800) 426-0856
DESCRIPTION:	The Touch Window is a touch sensitive pad or screen designed as an alternative to the standard keyboard. It attaches to the computer monitor with velcro strips. Users simply touch the screen to input information into the computer.
REQUIRED SOFTWARE:	Only software designed for the Touch Window will work with this device.
CONNECTION:	This board easily plugs into the back of the microcomputer via the 9 pin game I/O port.
COMPUTER:	Models are available for Apple and IBM computers.
APPLICATIONS:	The Touch Window has numerous applications for young children with handicaps as it responds to the lightest touch of a finger or stylus and provides the most direct input.
PHYSICAL ABILITY:	Only a very light touch is required to activate the Touch Window.
PRICE:	Approximately $250.00 (Apple) and $300.00 (IBM).

Source: Preschool Integration Through Technology Systems, (PITTS), United Cerebral Palsy Association of Western New York, Inc., 4635 Union Road, Buffalo, NY 14225; US DOE Grant #H024E80010.

TOUCH WINDOW: SPECIFIC INSTALLATION INSTRUCTIONS AND RESOURCES FOR PURCHASING

This module provides hands-on training for the Touch Window. Specifically, participants learn how to attach the Touch Window, plug it it, and use related software. Trouble shooting, calibrating the window, and classroom applications are also discussed. The module is divided into two sections: describing the Touch Window and installation and use.

If you are using a Touch Window for the first time and need to demonstrate the application of the velcro strips, the following directions may prove helpful:

- Remove the adhesive strips from the four furry-sided velcro strips and attach them to the backside of the Touch Window (two on top and two on the bottom).
- Place the coarse strips directly onto the furry ones, but do not remove the adhesive strips. Position the Touch Window in front of the monitor so that the top edge of the window is parallel with the top of monitor frame. For the most stable mounting, the strips should be positioned horizontally and as far apart as possible. When you have determined the best position, remove the adhesive covers, and press the Touch Window in place.

Because much of the preschool software is designed to work with the Touch Window and the Speech Synthesizer, this module follows the module on the Echo Speech Synthesizer. For a list of software for the Touch Window see "Preschool Software and Hardware Suggestions", found in Appendix B. If this module is introduced out of sequence, make sure that the participants know how to install and operate a speech synthesizer. Facilitator should assist teams by providing additional information on particular software programs. Caution facilitator to assist teams only when necessary (i.e., when equipment is in danger of being damaged or to answer questions about software). For further information on the installation of the Touch Window refer **MISSING COPY**

Introduction to the Touch Window

Show the device to the group and explain that the Touch Window is a peripheral which can be used instead of the standard keyboard. It can be used as a touch sensitive pad or touch screen by attaching it to the computer monitor with velcro strips. Versions are available for the Apple series of computers or the IBM.

Special software must be used with the Touch Window. *ONLY* software which has been designed for the Touch Window will work with this device.

Ways to use the Touch Window

Leader demonstrates the different ways that the Touch Window can be used including:

- touch screen — mounts on the monitor; provides direct access to the computer through touch
- graphics tablet — used on your lap or desktop to draw, trace, and construct graphics
- interactive book pad — used with specially developed books and software programs with overlays
- single switch — the entire screen surface acts as a large switch

Benefits of the Touch Window

The Touch Window has many benefits for young preschoolers with handicaps:

- it easily attaches to the computer monitor
- it directs all visual and motor abilities to the computer screen
- it provides computer independence at an early stage
- the slightest touch will accurately activate the software
- its large size makes it easy to access
- the shatterproof plastic surface is washable
- with the plastic overlay on top, you can use a pencil or crayon to draw pictures

TOUCH WINDOW INSTRUCTION SHEET

INSTALLING AND USING THE TOUCH WINDOW

Installing:

- make sure the computer is off
- align the velcro strips on the back of the Touch Window with the coarse velcro strips on the monitor
- press so that the Touch Window is firmly mounted
- locate the 9 pin I/O port on the back of the computer
- plug the Touch Window cord into the I/O port

Using:

- place the Touch Window software in the disk drive
- turn the computer on
- touch the targets to calibrate the window

Disconnecting:

- turn off the computer
- wait five seconds or longer
- remove the Touch Window from the monitor before you unplug it from the computer

TOUCH WINDOW SOFTWARE PUBLISHERS

Exceptional Computing, Inc.
450 NW 58th Street
Gainesville, FL 32607
904/331-8847

Laureate Learning Systems, Inc.
110 East Spring Street
Winooski, VT 05404
802/655-4755

Marblesoft
21805 Zumbrota N.E.
Cedar, MN 55011
612/434-3704

Sunburst Communications, Inc.
39 Washington Avenue
Pleasantville, NY 10570
914/747-3310
800/628-8891

UCLA/LAUSD Microcomputer Project
1000 Veteran Avenue, Room 23-10
Los Angeles, CA 90024
213/825-4821

TOUCH WINDOW VENDORS

Access Unlimited
SPEECH Enterprises
9039 Katy Freeway, Suite 414
Houston, TX 77024
713/416-0006

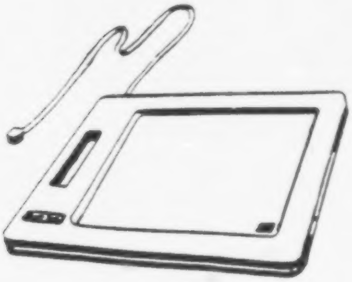
*Edmark Corporation
P.O. Box 3903
Bellevue, WA 98009
206/746-3900
800/426-0856

Exceptional Computing, Inc.
450 NW 58th Street
Gainesville, FL 32607
904/331-8847

*Manufacturer

Source: Preschool Integration Through Technology Systems, (PITTS), United Cerebral Palsy Association of Western New York, Inc., 4635 Union Rd., Buffalo, NY 14225; US DOE Grant #H024E80010

NAME:	**POWER PAD**



MANUFACTURER:	Dunamis Inc. 3620 Highway 317 Suwanee, GA 30174 (800) 828-2443
DESCRIPTION:	The Power Pad is a touch sensitive pad designed as an alternative to the standard keyboard. Overlays define press areas necessary to activate special software programs.
REQUIRED SOFTWARE:	The Power requires special software. Each program comes with a corresponding overlay. Apple computers require software designed for the Power Pad. An IBM starter kit is required for the IBM version of the Power Pad.
CONNECTION:	The Power Pad connects to the computer through the 16 pin game I/O port located inside the Apple computer. The use of an extender cable such as the Scooter Port or Power Port, permits the Power Pad to be plugged in externally. The IBM version of the Power Pad connects to the computer through a parallel interface and a Power Pad connector cable is required.
COMPUTER:	Models are available for Apple, IBM, VIC, and Commodore computers.
APPLICATIONS:	The Power Pad utilizes a variety of overlays which, when coupled with their accompanying software, turn the Power Pad into an alternative keyboard, a communication board, a game board, a piano keyboard, a learning center, or a graphics tablet. A variety of software programs and tool kits have been developed for the Power Pad with the handicapped individual in mind.
PHYSICAL ABILITY:	A moderate amount of pressure is required to activate the Power Pad.
PRICE:	Approximately $200.00 for Apple and IBM version; this price includes Power Port, cable, and tool kit software.

Source: Preschool Integration Through Technology Systems, (PITTS), United Cerebral Palsy Association of Western New York, Inc., 4635 Union Road, Buffalo, NY 14225; US DOE Grant #H024E80010.

POWER PAD: SPECIFIC INSTALLATION INSTRUCTIONS AND RESOURCES FOR PURCHASING

This module provides extensive hands on training for the Power Pad. Divided into three sections, this training first introduces the Power Pad and then explains how it can be used with special software and then as a talking communication board. Specifically, participants will learn how to plug in the Power Pad, use related software, program the Power Pad, and design customized overlays.

If time permits, the trainer should demonstrate each section and then let teams replicate the leader's action.

Because much of the preschool software is designed to work with the Power Pad and the speech synthesizer, this module is presented after Module 7: The Echo IIb Speech Synthesizer. If this module is introduced prior to Module 7, make sure that participants know how to install and operate a speech synthesizer. Also the Echo Speech Synthesizer needs to be installed in the computer before you can begin this module.

Introduction to the Power Pad

Demonstrate the Power Pad and overlays to the group. Explain that the Power Pad is a touch sensitive peripheral which works as an alternative to the standard keyboard. Overlays define press areas necessary to activate individual programs.

ONLY software designed to be used with the Power Pad will work with the peripheral.

An alternate introduction and overview activity for this module is to show Videotape 1, Special Friends and Computers: Using the Power Pad. If the videotape is used, resume this module with activity 3g.

Power Pad attributes

The Power Pad has several attributes which makes it appropriate for use with young children with handicaps including:

- it is moisture resistant
- there are no dead areas
- it accepts light to moderate pressure
- it uses pictures or symbols

POWER PAD INSTRUCTION SHEET

INSTALLING AND USING THE POWER PAD

Installing:

- make sure the computer is off
- locate the extender port on the computer
- plug the Power Pad cable end with the 16 pin connector into the extender port, lock-in the connector using the lever
- attach the telephone clip end into the Power Pad

Using:

- place Power Pad software disk in the disk drive
- put the corresponding overlay on the pad
- turn the computer on
- use the software program as directed

Disconnecting:

- turn off the computer system
- carefully remove 16 pin connector from the extender port by gently pulling on the connector head or by releasing the lever
- replace styrofoam immediately onto 16 pin connector to protect the connector from damage
- remove the software from the drive and return it to its jacket

POWER PAD SOFTWARE PUBLISHERS

DIL International, Inc.
2025 Lavoisier Street, Suite 180
Sainte-Foy (Quebec) CANADA G1N 4L6
(418) 687-9788

Dunamis, Inc.
3620 Highway 317
Suwanee, GA 30174
(404) 932-0485
(800) 828-2443

MarbleSoft
21805 Zumbrota, N.E.
Cedar, MN 55011
(612) 434-3704

UCLA/LAUSD Microcomputer Project
1000 Veteran Avenue, Room 23-10
Los Angeles, CA 90024
(213) 825-4821

POWER PAD VENDORS

Access Unlimited
SPEECH Enterprises
9039 Katy Freeway, Suite 414
Houston, TX 77024
(713) 461-0006

*Dunamis, Inc.
3620 Highway 317
Suwanee, GA 30174
(404) 932-0485
(800) 828-2443

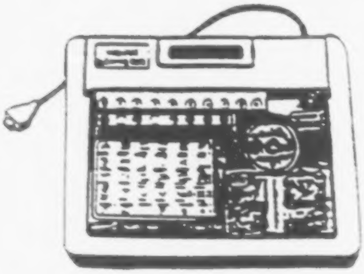
Don Johnston Developmental Equipment, Inc.
P.O. Box 639
1000 N. Rand Bldg. 115
Wauconda, IL 60084
(800) 999-4660

Exceptional Computing, Inc.
450 NW 58th Street
Gainesville, FL 32607
(904) 331-8847

*Manufacturer

Source: Preschool Integration Through Technology Systems, (PITTS), United Cerebral Palsy Association of Western New York, Inc., 4635 Union Rd., Buffalo, NY 14225; US DOE Grant #H024E80010

NAME:	**MUPPET LEARNING KEYS**



MANUFACTURER:	Sunburst Communications 39 Washington Avenue Pleasantville, NY 10570 (800) 628-8897 (914) 769-5030
DESCRIPTION:	Muppet Learning Keys is a touch sensitive keyboard designed especially for use with children. Letters and numbers are arranged in sequence. Other keys (i.e., stop/go) are marked with pictures of popular Muppet characters or colorful graphics.
REQUIRED SOFTWARE:	The keyboard works with specially designed educational software that is available from the manufacturer. Several different software programs have been designed to be used with the keyboard. Also available is a tool kit which allows educators to design their own software for the keyboard.
CONNECTION:	The Muppet Learning Keys easily plugs into the back of the computer via the 9 pin game I/O port.
COMPUTER:	Models are available for Apple and IBM computers. An adapter is needed for Apple II, II+.
APPLICATIONS:	Although this keyboard was originally designed for non-handicapped preschoolers, it can be used by young children with handicaps with no modifications. However, some educators have developed cardboard masks to define specific keyboard areas and to block out distracting keys. Others have developed picture overlays to be used with specially designed software.
PHYSICAL ABILITY:	The keys require a moderate amount of pressure within a half inch press area to be activated.
PRICE:	Approximately $129.00 (includes "Muppets on Stage" software)

Source: Preschool Integration Through Technology Systems, (PITTS), United Cerebral Palsy Association of Western New York, Inc., 4635 Union Road, Buffalo, NY 14225; US DOE Grant #H024E80010.

MUPPET LEARNING KEYS: SPECIFIC INSTALLATION INSTRUCTIONS AND RESOURCES FOR PURCHASING

This module provides an extensive hands-on training for the Muppet Learning Keys. Divided into three sections, this training first introduces the Muppet Learning Keys, and then explains how it can be used with special software, and then as a talking communication board. Specifically, participants will learn how to attach the Muppet Learning Keys, use related software, and program the Muppet Learning Keys as a talking communication device.

Introduction to the Muppet Learning Keys

Show the Muppet Learning Keys (MLK) to the group. The Muppet Learning Keys is a peripheral designed for preschoolers as an alternative to the standard keyboard. Special software is required to operate this device. *ONLY* software which has been designed for the Muppet Learning Keys will work with the peripheral.

The surface of newer versions of the MLK differ in that they identify letter keys with the upper and lower case letters, along with extra command keys. Stickers to upgrade older boards can be obtained free of charge from Sunburst Corporation.

Benefits of using the Muppet Learning Keys

The Muppet Learning Keys is a great way to introduce young children to computer learning. It can be used as a precursor to the standard keyboard. It has several attributes which makes it appropriate to use with young children who are handicapped including:

- the board is moisture resistant; spills will not harm the vinyl surface
- the durable board is oversized and easy to hold
- like keys are grouped together; letters are in alphabetical order, numbers are on a ruler, and color keys are on a paint set.
- function keys can be introduced such as STOP, GO, or ERASE along with the arrow keys
- the key areas are spaced slightly apart
- authoring software is available so that the Muppet Learning Keys can be used as a talking communication board.

MUPPET LEARNING KEYS INSTRUCTION SHEET

INSTALLATING AND USING THE MUPPET LEARNING KEYS

Installing:

- make sure the computer is off
- locate the 9 pin I/O port on the back of the computer
- plug the connector from the Muppet Learning Keys into the I/O port

Using:

- put the disk in the drive
- turn the computer on
- avoid touching the keys while the software is booting up as this will inactivate (or crash) the board
- use the software program as directed

Disconnecting:

- turn off the computer
- unplug the MLK from the 9 pin I/O port
- remove the software from the drive and return the software to its jacket

MUPPET LEARNING KEYS SOFTWARE PUBLISHERS

Peal Software
5000 N. Parkway Calabasa, Suite 105
Calabasa, CA 91302
800/247-4641

Sunburst Communications, Inc.
39 Washington Avenue
Pleasantville, NY 10570
914/747-3310
800/628-8891

MUPPET LEARNING KEYS VENDORS

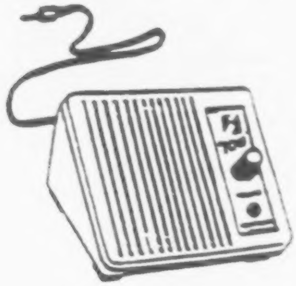
Access Unlimited
SPEECH Enterprises
9039 Katy Freeway, Suite 414
Houston, TX 77024
713/416-0006

*Sunburst Communications, Inc.
39 Washington Avenue
Pleasantville, NY 10570
914/747-3310
800/628-8891

*Manufacturer

Source: Preschool Integration Through Technology Systems, (PITTS), United Cerebral Palsy Association of Western New York, Inc., 4635 Union Rd., Buffalo, NY 14225; US DOE Grant #H024E80010

NAME: **ECHO SPEECH SYNTHESIZER**



MANUFACTURER:
Street Electronics Corporation
6420 Via Real
Carpinteria, CA 93013
(805) 684-4593

DESCRIPTION: The Echo Speech Synthesizer is an internal printed circuit card and speaker system which brings speech output to a computer. It has two voice modes: a limited vocabulary, natural sounding female voice; or an unlimited vocabulary, robotic voice. The board can also generate sound and music.

REQUIRED SOFTWARE: Only software that has been designed for the Echo Speech Synthesizer will actually "talk." If the card is not placed in the computer, software designed to "talk" will operate, but the user will not hear the voice or sound. The Echo IIb permits all computer sounds to emit through the attached speaker which comes complete with volume control and headphone jack.

CONNECTION: The circuit card fits into one of the expansion slots inside the computer. No technical expertise is required for installation. The speaker plugs into the card.

COMPUTER: Models are available for the Apple II+, IIe, IIGS; IBM PC computers.

APPLICATIONS: Speech synthesis enhances software and has many applications for the young handicapped user which include: reading directions, giving verbal prompts, and providing feedback and motivation. Its text-to-speech program gives the Apple an unlimited vocabulary.

PHYSICAL ABILITY: No physical ability is required to use this device.

PRICE: $129.95

Source: Preschool Integration Through Technology Systems, (PITTS), United Cerebral Palsy Association of Western New York, Inc., 4635 Union Road, Buffalo, NY 14225; US DOE Grant #H024E80010.

ECHO SPEECH SYNTHESIZER: SPECIFIC INSTALLATION INSTRUCTIONS AND RESOURCES FOR PURCHASING

INSTALLING THE ECHO IIb SPEECH SYNTHESIZER SYSTEM

Circuit Board:

- turn off the computer
- take the top off the computer
- touch the power supply to reduce static build up
- gently lift the printed circuit card, avoid touching the gold 'fingers'
- the card can be installed in any slot (seven is recommended in the IIgs)
- the manufacturer recommends that you use slot four, five, or seven if you are not currently using one of these locations for some other device
- use slot four in the Apple IIe
- align the gold 'fingers' with the slot
- gently rock the card back and forth while applying slight, but firm pressure to the circuit card
- the circuit card should fit securely in the slot

Speaker Box:

- locate the cable on the speaker
- locate the jack on the circuit card which is labeled 'speaker'
- plug the end of the speaker cable into the jack on the circuit card
- place the speaker next to the computer

Jumper Wire:

- locate the jumper wire
- locate the front right corner of the motherboard (the motherboard is the large green board on the floor of the computer)
- find the double wire connected to the motherboard
- unplug this wire
- replace this wire with the jumper wire by sliding one end of the connector over the now exposed two prongs
- attach the other end of the jumper wire to the prongs on the top edge of the circuit card

To Test:

- turn the volume control to a half way point
- put a software program in the disk drive
- turn the computer on
- if you do not hear a beep, notify your facilitator

ECHO SPEECH SYNTHESIZER SOFTWARE PUBLISHERS

Boces II Special Education
Microcomputer Resource Center
Sherwood Corporate Center
15 Andrea Drive
Holbrook, NY 11741

Colorado Easter Seal Society
5755 W. Alameda
Lakewood, CO 80226

Don Johnston Developmental Equipment, Inc.
1000 N. Rand Road, Bldg. 115
Boulevard 115
P.O. Box 639
Wauconda, IL 60084
800/999-4660

Edmark Corporation
P.O. Box 3903
Bellevue, WA 98009
800/426-0856

Exceptional Children's Software
P.O. Box 487
Hays, KS 67601
913/625-9281

Hartley Courseware, Inc.
P.O. Box 431
Dimondale, MI 48821
517/646-6458
800/247-1380

Laureate Learning Systems, Inc.
110 East Spring Street
Winooski, VT 05404
802/655-4755

Marblesoft
21805 Zumbrota N.E.
Cedar, MN 55011
612/434-3704

Peal Software
5000 N. Parkway Calabasa, Suite 105
Calabasa, CA 91302
800/247-4641

UCLA/LAUSD Microcomputer Project
1000 Veteran Avenue, Room 23-10
Los Angeles, CA 90024
213/825-4821

ECHO SPEECH SYNTHESIZER VENDORS

Access Unlimited
SPEECH Enterprises
9039 Katy Freeway, Suite 414
Houston, TX 77024
713/416-0006

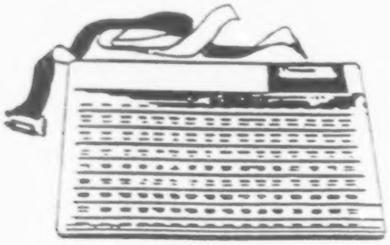
Exceptional Computing, Inc.
450 NW 58th Street
Gainesville, FL 32607
904/331-8847

*Street Electronics, Corp.
6420 Via Real
Carpinteria, CA 93013
805/684-4593

*Manufacturer

Source: Preschool Integration Through Technology Systems, (PITTS), United Cerebral Palsy Association of Western New York, Inc., 4635 Union Rd., Buffalo, NY 14225; US DOE Grant #H024E80010

NAME: **UNICORN EXPANDED KEYBOARD**

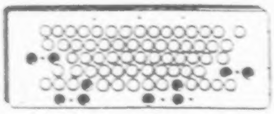


MANUFACTURER:	Unicorn Engineering Company 6201 Harwood Avenue Oakland, CA 94617 (415) 428-1626
DESCRIPTION:	The Unicorn Expanded Keyboard is an alternative to the standard keyboard. The 128 one inch square key areas can be redefined to create larger, but fewer key areas, so as to accommodate the physical capabilities of the users. When using commercial software with special software and a speech synthesizer, each key area can output a "spoken" message.
REQUIRED HARDWARE AND SOFTWARE:	To operate the Unicorn Expanded Keyboard, the Apple user first needs to have an Adaptive Firmware Card installed in the computer. IBM systems require an IBM Serial Aid. Software designed for the Apple and IBM computers will operate with the Unicorn Expanded Keyboard.
CONNECTION:	This board plugs into the I/O box which is part of the Adaptive Firmware Card system or PC Serial Aid.
COMPUTER:	Models are available for Apple and IBM computers.
APPLICATIONS:	The unicorn Expanded Keyboard allows complete keyboard access to individuals who have difficulty with the standard keyboard. Software programs can be activated by this input device which has the capability to group keys in order to enlarge the size of a press area, program active keys in a single section of the board (i.e., left side only) for individuals with limited motor use and permit speech output of user defined messages.
PHYSICAL ABILITY:	A moderate amount of touch is required to activate the press areas. The Unicorn Expanded Keyboard has an adjustable response time. That means that the user can set the rate of activation of the keys. Keyguards and a dead-spot eliminator are also available through the vendor.
PRICE:	$350.00

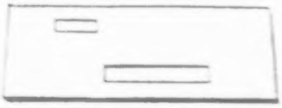
Source: Preschool Integration Through Technology Systems, (PITTS), United Cerebral Palsy Association of Western New York, Inc., 4635 Union Road, Buffalo, NY 14225; US DOE Grant #H024E80010.

KEYBOARD MODIFICATIONS

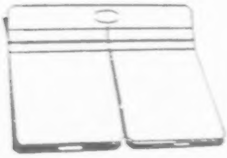
You may want to try modifying the standard keyboard to make it more successful for use by preschoolers with physical handicaps. The use of stickers to highlight important keys is one low cost suggestion. Other modifications include:



KEYGUARDS are plastic overlays with finger-sized holes that are placed over a keyboard. This prevents accidental key pressing.



Cardboard **MASKS** are placed over keyguards and are made to show only the keys that work individual software programs.



KEYBOARD COVERS are also placed over the standard keyboard and can be used with software which requires only two key selections.

Source: Preschool Integration Through Technology Systems, (PITTS), United Cerebral Palsy Association of Western New York, Inc., 4635 Union Rd., Buffalo, NY 14225; US DOE Grant #HO24E80010

LEVEL: STAFF

GOAL: **#3** Gain introduction to basic use of computer and peripherals with young children who have disabilities.

COMPETENCY TYPE: VALUE/ATTITUDE

OBJECTIVE: Participants will see the computer and peripherals as effective tools and understand that for some children, their use may provide the only means for participating in ongoing curricular activities.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
1. Individual or small group activity Each participant will attempt to "re-type" a paragraph while his/her hand is confined within a paper bag.	1. You will need: – Computers with a word processing program loaded (Magic Slate, Bank Street Writer, Muppets on Stage, or whatever you have). – "Lunch size" paper bags.	1. In discussion, emphasize that the computer and peripherals are *compensatory* tools for children with physical or cognitive limitations. Technology is a wonderful "equalizer"!
2. Large group activity Discuss the frustration felt in attempting to utilize a standard keyboard without the necessary physical abilities. Ask participants how children with similar limitations might feel when they cannot access the computer, and to discuss specific feelings and advantages which would result upon being provided a peripheral which allows them the ability to access the computer easily.		

GOAL 4

Technology

LEVEL: STAFF

GOAL: #4 Explore how application of computers and peripherals can be successfully integrated within a curriculum for young children with special needs.

COMPETENCY TYPE: KNOWLEDGE

OBJECTIVE: Having viewed examples via tape and demonstration, participants will list and discuss ways that computer applications can be integrated within the ongoing preschool curriculum.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
1. Large group activity Introduce the concept of integration of computer activities within the curriculum with Transparency S-T3. Show video, *Computer Learning for Young Children*. Ask participants to identify specific ways computer seemed to be integrated within the goals and activities shown.	1. Transparency (S-T3) *Goal of Integrating Computers* Video: *Computer Learning for Young Children*, High/Scope Foundation (NOTE: Check with your local SERRC for a copy of this video. You may also contact MEO/SERRC or Cuyahoga SERRC to inquire about possible loans.)	1. As ideas are offered and discussed, point out how computer is utilized to accomplish the ongoing curricular goals rather than as a "separate," "free time," or "reward" activity. Point out how off-computer activities are used to prepare students for computer activities, and reinforce computer activities. Emphasize that computer activities are tied directly to instructional goals. Point out specific examples.
2. Large group activity Giving participants a copy of *ONE* of the Preschool Curriculum Activities (from ACTT), review each step, discuss, and demonstrate the appropriate software and peripheral(s). (Be sure to choose one that utilizes items that are available!) While reviewing the activity, discuss how a specific child's learning needs can be met. Point out various adaptations that can be made for children with specific disabilities. Emphasize how this activity can fit into the program's overall curricular goals.	2. Preschool Curriculum Activities (from ACTT): Choose *ONE* Handout (S-H18-23) *The Wheels on the Bus Sing* *Happy, Sad - Scared, Mad* *Brown Cow, Brown Cow* *Stickybear Sounds* *Is This a Farm?* *FaceMaker Memory Game* – Computer, necessary software/ peripherals. Leader Notes (S-L7) *Computer Applications for Children with Specific Disabilities*	2. This activity will be strengthened by the degree to which you are able to "recreate" the atmosphere of an early childhood activity. Use of the suggested reinforcing materials will increase the activity's impact. **Additional Note:** Based on the interests of the audience, you may wish to incorporate the adaptations for a specific disability into your demonstration. See section following each of the Curriculum Activities, or *Computer Applications for Children with Specific Disabilities* in the Leader Notes S-L7.

S-T3

The goal of integrating microcomputers into the curriculum is to link software and computer activities with specific instructional objectives in ways that facilitate teaching and learning.

David Edyburn, *The Process of Integrating Software into the Special Education Curriculum*, Missouri Technology Center for Special Education.

The effective incorporation of computers into the classroom is dependent on the teacher's ability to develop computer activities that match the existing curriculum.

Trieschmann, M. & Lerner, J. W. (1990) *Using the computer to teach children with special needs: A Guidebook of effective computer strategies.*

THE WHEELS ON THE BUS SING

Content Area: Music, literacy, gross motor

Child Objectives:

1. Activate the PowerPad™.
2. Identify objects on the overlay.
3. Work cooperatively with others.
4. Develop social skills.

Materials:

Poster Board and large marker
Clear contact paper or some other laminating medium
Grease pencil
PowerPad™
Echo™ Speech Synthesizer
The Wheels on the Bus (UCLA/LAUSD)
Overlay

Procedures:

Related Activity:

1. Create an open ended song board with the poster board. Laminate or have it laminated so it can be written on, then wiped off and reused.
2. During circle time, sing the song, "The Wheels on the Bus," singing well known verses and making up new ones. Before each verse is sung, erase the last verse and write the new verse in the blanks on the song board.
3. Some children don't come to school on the bus; make up verses for "The Wheels on the Car" and sing to the tune for "The Wheels on the Bus." Write the words for each verse on the song board, again wiping off the last verse and inserting words for the current verse.

Computer Activity:

Before the activity: Install the Echo™ card in slot four inside your computer and plug the speaker wire into the card. Insert the 16-pin connection of the PowerPad™ cable to either the internal game port or an external EZ-port or PowerPort and the clip end of the cable to the PowerPad™. Boot **The Wheels on the Bus.** Secure the overlay to the PowerPad™. Place the monitor so all children will be able to see.

1. Continue this activity during circle time. Ask questions — "Who rides the bus?" "Where are the people on the bus going?" "Is a school bus the same as a city bus?" "How do we ride on a bus?" "Is riding a bus different than riding in a car?" "Is a car or a bus bigger?"
2. Pass the PowerPad™ to each child. As each child activates a space, part of the song will play. Encourage children to sing along.

Helpful Hints:

Often a firm press on the PowerPad™ is needed to activate the program. Encourage those with a light touch to press hard without banging on the Pad.

Variations:

See "Paint by Bus" in this section for another activity idea.

Adaptations:

Visual Impairment: Make a smaller version of the large story board with a variety of thick cardboard forms representing the people and objects from the song. As the story is created encourage the child to feel the forms to find the appropriate one to stick on his storybook. He can the "read" along with the rest of the children by feeling the forms in his book. For the computer activity, make a tactile overlay using textures or objectives, such as hair for mommy's head and a small bottle for baby.

Auditory Impairment: Use signs for the words on the story board. Ask child to use his own familiar signs to contribute to part of the story. During the computer activity, earphones can be used with the Echo to amplify the speech.

Motor Impairment: If the child is unable to sing along with the other children, a tape could be made of a family member, such as a brother or sister, or a friend singing the song. With the tape recorder attached to a switch, the child could then take part in the group activity by pressing his switch to make his tape sing. The tape could also be the background music for the song so that the child plays the music while the others sing. For the computer activity this child may need assistance in pressing the PowerPad™. A small wooden puzzle piece with a knob could also be held by the child when pressing on the Pad to help apply extra pressure.

Source: Building ACTTive Futures, ACTT's Curriculum Guide for Young Children and Technology, Macomb Projects, College of Education, Western Illinois University, Macomb, IL 61455

HAPPY, SAD — SCARED, MAD

Content Area: Social interaction, art, health

Child Objectives:

1. Interact with others
2. Express feelings verbally
3. Recognize feelings
4. Discriminate between anger and hurt

Materials:

Reproductions of art works of facial expressions (Mona Lisa)
PowerPad™
Echo™
Feelings (UCLA/LAUSD)
Overlay
Paper and crayons

Procedures:

Related Activity:

Find pictures of famous works of art. Calendars, posters, and museum post cards are good sources for these pictures. Laminate pictures for durability. During circle time present different images of faces. Ask the children to help you decide how the person in each picture feels. "Does that person feel happy, angry, scared, sleepy ...?" "What makes people feel like that?" "What happens to you to make you feel happy?" "Do you feel different when someone hurts your feeling and when someone makes you angry?" "What do you do when you feel angry?" "When you feel happy?" "What happens to your face when you feel that way?" Offer children the opportunity to draw a face or picture of how they feel.

Computer Activity:

1. Install Echo™ card and plug the PowerPad™ cord into the 16-pin internal game port or an external PowerPort and attach the other end of the cord to the PowerPad™. Boot the software program **Feelings** to be certain it works properly. Attach the **Feelings** overlay to the PowerPad™ Select the menu option you wish to use. Place the monitor where all children can see it.
2. This activity can be used in circle time or in small groups. Pass the PowerPad™ among the children. As each child activates an area on the PowerPad™, talk about feelings that might make your face look like the face on the monitor.
3. Encourage discussion about different kinds of feelings.

Variation:

Another software program that can be used in a similar way is **If You're Happy and You Know It** (UCLA/LAUSD). It is a PowerPad™ program also.

Adaptations:

Visual Impairment: Use dolls, masks, or textured pictures which have dramatic facial expressions for the child to feel. Offer the child the opportunity to feel your face as you make the different expressions, then encourage her to feel her own face as she tries to imitate the expressions. Use a textured overlay for the PowerPad™ activity. String or sandpaper could be used to form the different expressions on the overlay.

Auditory Impairment: Use signs to express the different feelings. Headphones could be attached to the Echo™ to amplify the speech in the program.

Motor Impairment: If child has difficulty pressing an area on the PowerPad™, a small wooden puzzle piece with a knob could be held while pressing to help in applying more pressure.

Source: Building ACTTive Futures, ACTT's Curriculum Guide for Young Children and Technology, Macomb Projects, College of Education, Western Illinois University, Macomb, IL 61455.

BROWN COW, BROWN COW

Content Area: Science, language development, color recognition, cooperative play, listening skills

Child Objectives:

1. Identify different animal sounds
2. Identify distinguishing characteristics of different animals
3. Work cooperatively with others

Materials:

PowerPad™
Echo™ speech synthesizer
Old MacDonald's Farm I and **II** (UCLA/LAUSD)
Overlay
Enlarged pictures from overlay copied on card stock, each animal colored one color (brown cow, black sheep, pink pig)
Laminating film or clear contact paper
Method for binding

Procedures:

Related Activity:

1. Prepare a book using the colored animals based on the story, "Brown Bear, Brown Bear."
2. During circle time, read the book with help from the children. "What color is the cow?" "What does the cow see looking at me?"
3. Question the colors of the animals. "Are there really purple ducks?" "Have you seen a green chicken?"
4. Talk about different kinds of animals, are they all farm animals? "What makes an animal a farm animal?"

Computer Activity:

1. Insert Echo™ card and plug in the PowerPad™. Boot the software and make sure the program works correctly. Turn off the monitor and turn down the Echo™ until you are ready for the computer activity. Secure the overlay to the PowerPad™.
2. This works well as a circle activity. Children can take turns activating the PowerPad™. Encourage discussion about what the animal is, where it lives, what it eats, and the names for the young (calf, piglet, chick, lamb).

Variation:

Sing "Old MacDonald Had a Farm" or "Did You Feed My Cow"; children can make up their own verses. When using **Old MacDonald's Farm II**, talk about the prepositions which are used in the program. Use plastic farm animals and a play farm scene to encourage children to move an animal in front of or next to something. Offer the children an opportunity to pretend they are animals themselves moving in different locations, as the animals in the software. Take children to visit or invite someone to bring small animals into the classroom, one or two at a time. Children need to touch and see the real thing.

Adaptations:

Visual Impairments: Use a textured book on farm animals. Also offer the child stuffed animals or plastic animals to feel the different features of each one. Talk about one characteristic feature of each animal, such as feathers for a chicken, and use that as the basis for making a textured overlay for the PowerPad™.

Auditory Impairment: Use signs for each of the farm animals. For needed amplification of the speech in the program, attach headphones to the Echo™ speech synthesizer.

Motor Impairment: If child has difficulty pressing an area on the PowerPad™, a small wooden puzzle piece with a knob could be held while pressing to help in applying more pressure.

Source: Building ACTTive Futures, ACTT's Curriculum Guide for Young Children and Technology, Macomb Projects, College of Education, Western Illinois University, Macomb, IL 61455.

STICKYBEAR SOUNDS

Content Area: Language development, initial sound comparison

Child Objectives:

1. Sort objects by beginning sound
2. Interact in a group situation
3. Identify objects

Materials:

Stickybear ABC's (Weekly Reader)
School box
Picture of Stickybear (use a FingerPrint card or another screen dump utility to print the picture)
Vinyl letters
Small objects with the same beginning sound and letter to put in the school box
Full sheet label

Procedures:

Related Activity:

1. Print Stickybear's face and shoulders on the full sheet labels, laminate the label and attach it to the lid of the box.
2. Stick a vinyl letter to the box and then fill it with objects having that beginning sound (dog, donkey, door).
3. Pass the box around the group. Each child selects an object, identifies it, and tells something about it. ("This is a sock." "It goes on a foot." "It's white.")

Computer Activity:

1. Boot software (the child can do this).
2. As the child explores the keyboard the association between the key pressed and the image on the monitor can be made.
3. Ask questions about the pictures, encourage discussion about what is happening in the pictures. Make a short rhyme about it (Boppy balls bounce) to chant.

Variation:

Nursery rhymes or other verses with repetitive first sounds could be repeated during the circle time (Peter, Peter, Pumpkin-eater). Books or stories that repeat sounds could also be read (Bippity Boppity Boo).

Adaptations:

Visual Impairment: Attach textures to the stickers on the box so the child can identify the letter being used. Encourage the child to feel each object in the box as the beginning sound is discussed. Place textured stickers on the keyboard to help the child locate certain letters. Since there are many different sounds in this program, an association can be made between the sound and the letter. Help the child with the association by describing what is happening on the monitor.

Auditory Impairment: This activity offers a good opportunity to introduce or reinforce the sign for each letter in the alphabet.

Motor Impairment: If the child cannot use the keyboard, an alternate input device, such as a switch or Unicorn Expanded Keyboard™ and the Adaptive Firmware Card™ could be used with this program. Refer to the procedures in the section on applications for children with severe disabilities.

Source: Building ACTTive Futures, ACTT's Curriculum Guide for Young Children and Technology, Macomb Projects, College of Education, Western Illinois University, Macomb, IL 61455

IS THIS A FARM?

Content Area: Social Studies, language development, science

Child Objectives:

1. Develop identification skills
2. Express opinions verbally
3. Increase sorting skills

Materials:

- Poster board
- FingerPrint or another screen dump
- Printer and four-color ribbon
- Poster board
- Laminating film or clear contact paper
- Static cling vinyl
- Puff paint or permanent ink markers
- **The Playroom** (Broderbund)
- Toy farm set

Procedures:

Related Activity:

1. Boot **The Playroom,** remove extra items from the farmyard and print the background. Glue the background to poster board and laminate. Use coloring books for tracing or drawing animal pictures; don't restrict the pictures to only farm animals. If you use other kinds of animals, you can make this a sorting activity. Trace or draw animals and objects onto static cling vinyl. Pay attention to relative size (cow is large, cat is small, pig is somewhere in between). Color and cut them out.
2. Discuss the kinds of animals and objects that could be found on a farm. "Are there differences between farm animals and other animals?" "What are different things you know?" Ask children to select farm animals or objects to stick to the farm scene and place them where they want.
3. Ask where the other animals and objects that are not farm related belong. "How do you know that?"

Computer Activity:

1. Boot **The Playroom** software and select the activity that contains the fairyland, mainstreet U.S.A., and a farmyard.
2. Before asking the children to participate in the activity, remove all the extra characters and objects in the scene. Continue the discussion about the kinds of animals you find on a farm.
3. As children make selections to add to the picture, question why they think that particular animal or object might belong in a farm scene.

Variation:

Katie's Farm (Lawrence Productions) is an excellent software program about farm life. It would be a nice addition to a farm unit. Also **Old MacDonald's Farm I** and **II** (UCLA/LAUSD) are PowerPad™ programs which could be used for the farm animal theme. Refer to "Brown Cow, Brown Cow" activity in this section. A field trip could be planned to visit a farm. Take pictures during the visit so that a book can be made about the children's experiences and the different animals, and activities on the farm. The book could be used as a related activity on another day. Dramatic play with the farm set provides opportunities to repeat the experience.

Adaptations:

Visual Impairment: Add textures to vinyl animals so that the child can feel to identify characteristics of different farm animals. Use a textured book on farm animals. Also offer the child stuffed animals or plastic animals to feel the different features of each one. Since the **Playroom** requires a visual orientation for controlling the cursor movement on the screen, another program, such as **Old MacDonald's Farm I** for the PowerPad™ may be more appropriate. Talk about one characteristic feature of each animal, such as feathers for a chicken, and use that as the basis for making a textured overlay for the PowerPad™.

Auditory Impairments: Use signs for each of the farm animals.

Motor Impairment: An alternate input device, such as a switch or Unicorn Expanded Keyboard™ could be set up with the Adaptive Firmware Card™ to take the place of the mouse. See the "Hidden Fish" activity in this section for procedures. Also a joystick or Touch Window®could be used with this program. (Note: Touch Window®input with Explore-a-Story programs is not the best. Objects move separate from where the child points.)

Source: Building ACTTive Futures, ACTT's Curriculum Guide for Young Children and Technology, Macomb Projects, College of Education, Western Illinois University, Macomb, IL 61455

FACEMAKER MEMORY GAME

Content Area: Visual memory, thinking skills

Child Objectives:

1. Use the icon cards to develop a pattern for the face to perform
2. Chart sequences
3. Program the face to complete the charted sequence.
4. Imitate facial gestures that illustrate feelings

Materials:

Facemaker Golden Edition (Spinnaker)
Prepared icon stickers for animation
Prepared icon cards for charting and creating patterns of sequential animation.

Procedures:

Related Activity:

1. Have several activities available near the computer center for children to construct faces. Crayons and paper plates, felt board and "face" pieces, Mr. Potato Head, clown make-up and mirrors, materials for a "Do it Yourself" bulletin board.
2. Conduct a feelings or expressions lesson. Discuss the way people's faces look when they are happy, sad, angry, tired, afraid, surprised, worried or confused. Write experience stories about some of these feelings and have children illustrate their stories.
3. Have children recall a series of events periodically during the day beginning with a two-step memory series and moving to a four-step series. "What did you do first when you came to school?" "Then what did you do?"

Computer Activity:

1. Choose a child to insert **Facemaker** disk into drive and close the drive door. Ask another child to turn on the computer and monitor. Place icon stickers over appropriate keys and review what each sticker represents. (See documentation for details).
2. Ask the children to "build" a face that can be used in the "game" section.
3. When a face is completed direct children to the "program" option and use icon cards to develop a series of patterns for the face to repeat. Chart the sequences and repeat the programmed series by pressing "return." Mix up cards and repeat animation again. Ask children to put the cards back in order again the way the face shows them to us. Start with two or three icons at a time and increase icons as children in the group master the task.
4. Encourage children to develop the ability to remember a series of actions in a specific order. Use icon cards to help children remember the order of the series of animation. Using icon cards which match the represented sticker icons children can organize their thoughts and continue to work together for longer periods of time with this program. Remove the use of icon cards as the activity is repeated increasing the opportunity for children to rely on visual memory and sequential thinking skills.

Variation:

1. Ask children to imitate the face on the computer. Have them program each other using the icon cards or verbal instructions.
2. Present a printer activity using **Mask Parade** (Springboard) to construct a mask. Encourage construction of masks that show a variety of feelings so they can be used in a discussion group and later used on a bulletin board.
3. Use ideas from the "Happy, Sad — Scared, Mad" activity.

Helpful Hints:

Some children may have trouble recognizing the differences in the facial movements. The "cry" and "wink" gestures made with the eyes and the "smile" and frown gestures made with the mouth may be difficult for some children to identify. Visual discrimination details can be pointed out for the children, for instance, "Watch for the tear when the eyes cry," and "Look at the man's eyes when he is sad; they look different than when he is happy." Children may need to troubleshoot by reorganizing their commands if a sequence is not correct. Vary the number of items in the sequence since some children may need shorter sequences than others.

Adaptations:

Visual Impairment: Use amplified speaker to increase the sound the program makes as the face becomes animated. Attach tactile clues to the keycaps of the keys which operate the program. Be sure to select a black screen as the white screen is more difficult to see.

Auditory Impairment: Use amplified speaker or headphones depending on the degree of severity of the hearing loss.

Motor Impairment: Use the Adaptive Firmware Card with simplified scanning array to allow for single switch input. Begin with three scanning items and gradually add the rest of the facial features as the child becomes more familiar with the scanning of words or symbols.

Source: Building ACTTive Futures, ACTT's Curriculum Guide for Young Children and Technology, Macomb Projects, College of Education, Western Illinois University, Macomb, IL 61455.

PART I

COMPUTER APPLICATIONS FOR CHILDREN WITH SPECIFIC DISABILITIES

In this section, we consider the needs of children with specific disability areas. The following discussion is categorized in two groups: (1) general considerations for using computers with children with various disabilities and (2) specific considerations for children with autism, visual, hearing, and physical disabilities. Each discussion includes information for children whose levels of impairment range from mild to severe. It is important that computer activities are designed to meet the individual, cognitive and physical needs of each child.

GENERAL CONSIDERATIONS FOR USING COMPUTERS IN ALL DISABILITY AREAS

The following guidelines should be taken into account when using computers with children who have special needs.

- Give clear, concise directions to children about how to control the computer.
- Post reminders to assist children who need help in locating control keys. For example, place stickers or symbols on the keyboard or adaptive device.
- When appropriate, use real objects or props in conjunction with computer activities. This can assist children in transferring skills to various environments.
- Place a speaker on top of the monitor to direct children's attention to the text or graphics. This also allows the teacher to easily control the volume of the computer sounds.
- Structure activities to enhance communication and interaction with the teacher or other children.
- Provide children with choices and control within computer activities.
- Plan lessons that will allow the children to create products, e.g., a printed story, picture, or an audio tape of a song created on the computer.
- Allow children to utilize a variety of input devices to control the computer.
- Select software that is open-ended and allows for individual levels.

CONSIDERATIONS FOR USING COMPUTERS IN SPECIFIC DISABILITY AREAS

Children with Mental Delays

Most children with mental delays respond positively to computer activities. Depending on the software, the computer can be forever patient, highly motivating, and easily controlled. The selection of software programs should be based on the children's interests and cognitive abilities. Children with severe mental impairments may use the computer only as a "cause and effect" toy to be turned on and off. Other children may use it to learn survival signs. Although most children respond positively to sound, lights, movement, and music these attributes are especially enticing for children with severe mental delays.

Children with mild to moderate mental delays should be able to use software programs that have two or more commands. These commands can be represented by pictures, letters, or stickers. Children should learn to use several input devices in order to access a variety of software programs. For example, a child may be able to easily manipulate a joystick, but have difficulty utilizing the keyboard. This may limit that child in using certain software programs. Adapting the keyboard with a keyboard overlay and colored stickers may provide the child with the cues needed to control the program. Touch pads, switches, joysticks, and keyguards have been successfully used by many of these children.

Children with Visual Impairments

It is obvious that children with visual impairments will have difficulty interacting with the computer since the output is typically visual. Adaptive devices for visually impaired individuals include braille keyboards, braille screen readers, braille printers, large screen displays, and software programs that use speech synthesizers. Children should be individually assessed to determine which software programs and adaptive devices are most appropriate. Many children with visual impairments do have some vision so that minimum feedback is possible. Some children with visual impairments have enough vision to see the text and graphics on the computer monitor if screen enlargement devices are used.

It is important that children with visual impairments feel comfortable in the computer environment. Allow time for the children to physically explore the room and the computer before activities are introduced. Let them touch all the components of the computer, including a blank disk.

Consistent use of software programs is important for all children, but especially for children with visual impairments. Familiarity with a specific computer program or adaptive device can provide an anchor and comfortable environment for these children.

Suggestions for Using Computers with Children Who Have Visual Impairments

- Use programs that include large graphics, as well as animation, sound, and music.
- Place tactile stimuli on the keyboard, keyguard, keyboard covers, and touch pads to help children distinguish between various control keys.
- Utilize the directional capabilities of the joystick to assist children in controlling the computer.
- Place a speaker on top of the monitor to assist children in locating the visual screen display.
- Program the Unicorn Board to speak the commands that the children give the computer.
- Utilize software that is compatible with a speech synthesizer or text-to-speech output or input.

Children with Hearing Impairments

Since the computer is such a visual medium, many children with hearing impairments readily attend to computer activities. In fact, some children with hearing impairments tend to become so engrossed in the computer screen that they are reluctant to communicate or cooperate with peers or teachers.

In order to avoid "losing" these children to the computer generated text and graphics, activities that encourage communication and cooperation should be selected. Using props in conjunction with computer activities can attract the child away from the screen and toward another medium, the teacher, or a classmate. For example, when using a counting software program, provide counters and containers so the child can count with the computer and also with the objects.

Some of these children are able to take advantage of software with sound through the use of volume controlled adaptive devices such as head phones or external speakers.

Suggestions for Using Computers with Children Who Have Hearing Impairments

- Use real objects or props with computer activities.
- Use an external speaker to control the volume of the software program.
- Remove other visual and auditory distractions from the area.
- Verbally repeat or manually sign the words that the computer speaks or sings.
- Develop cooperative computer activities to stimulate communication.

Children with Language Disorders

Software programs that encourage receptive and expressive language are particularly suitable for children with language disorders. Animation, music, and speech synthesis are important features of these software programs.

Speech synthesizers provide a particularly stimulating environment for children with limited language skills. Children should comprehend the speech and understand the meaning of each word that the computer speaks. The lesson plans should include activities in which computer generated words are verbally used and repeated by the children. Through the repeated use of specific software programs children gain familiarity with the language associated with those programs, and the ability of the children to use words, phrases, and sentences increases.

Children with Physical Impairments

For children with physical impairments the computer may be one of the few objects that they can manipulate independently. Adaptive devices, such as the joystick, touch window, PowerPad, Unicorn board, Adaptive Firmware Card, and switches provide children with physical impairments access to computer software. It is important that these children be positioned in the most optimal manner to access the computer. Positioning should be determined through consultation with the child's occupational or physical therapist.

A specific child may find initial success with one type of input device, but it is important not to limit that child to that single device. The ability to use a variety of input devices allows the child access to a wider variety of software programs.

The selection and use of adaptive devices, such as mouthsticks, headpointers, miniature keyboards, optical headpointers and keyboard emulators should always be prescribed by the child's occupational or physical therapist. These devices can be programmed or designed to control software programs.

Some children with physical handicaps have augmentative communication systems; devices that allow them to communicate through pictures, symbols, or synthesized speech. Many of these systems can be hooked up to the computer and used as input devices. It is always best to contact the company that developed the communication system for assistance in connecting the device to the computer.

Suggestions for Using Computers with Children Who Have Physical Impairments

- Obtain assistance from the child's physical or occupational therapist to determine optimal positioning.
- Provide the child with opportunities to utilize a variety of input devices.
- Be aware of each child's physical reactions to specific visual or auditory output from the computer. Some programs may be overstimulating for certain children.
- Utilize software that includes voice output for non-verbal children.

Children with Autism

Children with autism, or "autistic-like" behaviors, generally interact well with computer activities. In addition, interaction between children and between children and teachers can be increased through the use of microcomputers. Graphics, animation, and sound are likely to capture the interest of children with autism. Communication, interaction, and turntaking should be incorporated into as many computer sessions as possible.

The methods of computer use and software selection could have a positive or negative effect on an autistic child. Therefore, it is important to select software programs that are motivating and have the potential to be interactive. Since some children with autism tend to display perseverative behavior while using the computer, it is imperative that activities be structured so the child is required to interact with others before, during, and after the computer activity. Learning to communicate and interact with others are key goals for most children with autism.

Suggestions for Using Computers with Children with Autism

- Structure activities to enhance communication and interaction with the teacher or other children.
- Provide children with choices and control within the activities.
- Utilize software programs that include speech output.

Children with Learning Disabilities

Children with learning disabilities are able to use most software programs and various input devices, including the regular keyboard. When selecting software and creating activities, the teacher should be sensitive to the various levels of achievement, styles of learning, and areas of academic success and difficulty.

The computer can be a highly motivating tool for children with learning disabilities. Adapting the input method for various children may allow them to interact with the computer independently. If a child has difficulty with directionality and cannot use the joystick, then the arrow keys on the keyboard may be used.

Many children with learning disabilities may be above age level in certain skill areas even though they are below in others. Therefore, these children need challenging, stimulating, and interactive learning experiences. In general, the computer is a highly motivating medium for most children with learning disabilities.

Children with Behavior or Emotional Disorders

One of the characteristics of children with behavior or emotional disorders is that they can be easily frustrated. They tend to work well with the computer as long as they are allowed some control over the program. Open-ended programs with few right or wrong answers should be used when the children are first introduced to the computer.

All children need to feel competent and safe in new situations, but for children with behavior or emotional problems the impact of the initial computer contact can have a direct effect on their desire to use it. The first computer session should be planned so that children become aware of the basic structure and format of the sessions.

Another characteristic of children with behavior or emotional disorders is their desire to control people and objects in their environment. Step by step explanations should be given to these children so that they know what to expect. For example, telling the children that a new activity will begin in two minutes or when they have taken two more turns, allows them to prepare for transitions. Activities should be structured so that children have limited control during the computer session. For example, a child should be given a choice between two (rather than six) options. This would provide ample opportunity for control.

Source: Trieschmann, M. & Lerner, J. W. (1990). *Using the Computer to Teach Children with Special Needs: A guidebook of effective computer strategies.* Evanston, IL: National Lekotek Center.

LEVEL: STAFF

GOAL: **#4** Explore how application of computers and peripherals can be successfully integrated within a curriculum for young children with special needs.

COMPETENCY TYPE: SKILL

OBJECTIVE: Participants will use an early childhood software program and utilize appropriate steps to design activities for effectively integrating its use within the curriculum.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
1. Large group activity Using the Transparency/Handout provided, go over the steps for *Integrating Computer Activity within the Early Childhood Curriculum:* a. Determine the child's specific goals. b. Preview and select software to meet goals. c. Select appropriate peripherals for computer input and possible speech or print output. d. Experiment with software to discover the variety of ways that it can be used. e. Define prerequisite skills for operating software and hardware. f. Plan both "pre" and "post" off-computer classroom activities to: (1) prepare for computer activity; and (2) reinforce skills gained through computer activity. g. Evaluate effectiveness of computer activity on an ongoing basis and modify as necessary.	1. Transparency/Handout (S-T4, S-H24) *Integrating Computer Activity within the Early Childhood Curriculum* Leader Notes (S-L8, 9, 10, and 11) *Integrating Computers into the Curriculum* *Computers in Preschool Classrooms* *The Process of Integrating Software into the Special Education Curriculum* *The Learning Environment*	1. For more in-depth information on these concepts, see Leader Notes S-L8 and 9. The Process of Integrating Software into the Special Education Curriculum (This article provides a highly comprehensive analysis of integration into curriculum. It is included to give the leader a solid base of knowledge for reference purposes, but is not intended for direct use within this module.) *The Learning Environment* (This contains many specific suggestions for integrating applied technology within the classroom. Based on the needs of the audience, this may be appropriate as a Handout.) In discussing the determination of goals at the beginning of the process, be sure to emphasize that the software should always be chosen based on the child's goals — not the reverse. Goals should never be developed for a child based only on available software.
Leader may elaborate on the wide range of goals which may be developed through use of the computer. Handout S-H25, *Why Use a Computer* may be passed out and discussed briefly to coincide with Step 1 in the integration process.	Handout (S-H25) *Why Use a Computer*	

LEVEL: STAFF *(continued)*

GOAL: #4 Explore how application of computers and peripherals can be successfully integrated within a curriculum for young children with special needs.

COMPETENCY TYPE: SKILL (continued)

OBJECTIVE: Participants will use an early childhood software program and utilize appropriate steps to design activities for effectively integrating its use within the curriculum.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
2. Large group activity Using Transparency S-T5/Handout S-H26, *Stages of Activity,* briefly discuss the purpose of each of the three stages of computer activity. Emphasize the need for developmentally appropriate methods and concrete materials. Participants may give examples of each of these types of activities they observed in the video or the lesson demonstrated.	2. Transparency/Handout (S-T5, S-H26) *Stages of Activity to Accompany Computer Use in the Early Childhood Curriculum*	
3. Individual or small group activity Participants should work at computer stations, operating software which has been loaded. If multiple computers are not available, participants can take turns operating one computer and demonstrating programs.	3. Select two to three early childhood software programs available from your local SERRC library. Some common titles are: *Creature Chorus* *Early Learning* *McGee* *Katie's Farm* *Buddy's Body*	3. See additional software information listed in the "Supplemental Resources" section of the module.
4. Individual or small group activity Ask each participant to develop ideas for each step of the integration process based on one piece of software they have viewed and the individual needs of a particular child in their class. Participants may choose to work with a partner to complete a *Computer Activities Worksheet.*	4. Handout (S-W1) *Computer Activities Worksheet* Transparency (S-T4) *Integrating Computer Activity within the Early Childhood Curriculum*	4. *Be sure to have spent ample time with your selected software in order to have ideas prepared for this discussion!* Appropriate kinds of ideas may be generated from the ACTT Computer Curriculum Activities (Handouts S-H18-23) as well as *Integrating Computers into the Curriculum* and/or *Computers in Preschool Classrooms* (S-L8 and 9).

LEVEL: STAFF *(continued)*

GOAL: **#4** Explore how application of computers and peripherals can be successfully integrated within a curriculum for young children with special needs.

COMPETENCY TYPE: SKILL *(continued)*

OBJECTIVE: Participants will use an early childhood software program and utilize appropriate steps to design activities for effectively integrating its use within the curriculum.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
5. Small or large group activity After sufficient time, ask participants to share their ideas in small groups. Discuss the strengths and weaknesses of the activities suggested and offer additional ideas for these pieces of software. Point out specific ways that activities could be implemented within various phases of the curriculum. The leader may wish to share *Computer Activities Worksheet: Facemaker* for additional examples of precomputer, computer, and post-computer activities.	5. Handout (S-H28) *Computer Activities Worksheet: Facemaker*	5. This would be especially appropriate if participants are familiar with *Facemaker.*
6. As additional resources, the leader may share Handout S-H29, *Checklist for Setting Goals* and Handout S-H30, *The Innotek Model for Teaching with Computers.*	6. Handout (S-H29) *Checklist for Setting Goals* Handout (S-H30) *The Innotek Model for Teaching with Computers*	6. These are slightly different approaches educators may choose to use in planning how to integrate the computer within curricular activities.

INTEGRATING COMPUTER ACTIVITY WITHIN THE EARLY CHILDHOOD CURRICULUM

1. Determine the child's specific goals.

2. Preview and select software to meet goals.

3. Select appropriate peripherals for computer input and possible speech or print output.

4. Experiment with software to discover the variety of ways it can be used.

5. Define prerequisite skills for operating software and hardware.

6. Plan both "pre" and "post" off-computer classroom activities to: (a) prepare for computer activity; and (b) reinforce skills gained through computer activity.

7. Evaluate effectiveness of computer activity on an ongoing basis and modify as necessary.

S-H24

INTEGRATING COMPUTER ACTIVITY WITHIN THE EARLY CHILDHOOD CURRICULUM

1. Determine the child's specific goals.

2. Preview and select software to meet goals.

3. Select appropriate peripherals for computer input and possible speech or print output.

4. Experiment with software to discover the variety of ways it can be used.

5. Define prerequisite skills for operating software and hardware.

6. Plan both "pre" and "post" off-computer classroom activities to: (a) prepare for computer activity; and (b) reinforce skills gained through computer activity.

7. Evaluate effectiveness of computer activity on an ongoing basis and modify as necessary.

PART II

INTEGRATING COMPUTERS INTO THE CURRICULUM

One of the major reasons that computers are not fully utilized in special education classrooms is that the computer activities are not integrated into the school curriculum. Teachers often view the computer as something apart from their regular instruction. Consequently, while children enjoy using the computer, it is used often as a reward or as a free time activity instead of an integral part of the curriculum.

Research shows that the software available to teachers often does not meet the application needs of the school, the teacher, or the child (Panyan, Hummel, & Jackson, 1988). Many teachers do not have adequate access to quality software programs, enough training on how to utilize computers and software in their classrooms, or sufficient time and resources to develop appropriate computer activities that match their students' goals and objectives.

There are thousands of quality software programs appropriate for children with disabilities that are available for a wide range of computer systems. These programs need to be molded to the specific needs of the teacher, students, and classroom. The effective incorporation of computers into the classroom is dependent on the teacher's ability to develop computer activities that match the existing curriculum.

In Part II we discuss the integration of computer activities into four curriculum areas:

- **Pre-academic Learning**
- **Language Development**
- **The Writing Process**
- **Problem Solving/Thinking Skills**

Software recommendation and sample lesson plans for each of the four curriculum areas are also provided. The four areas, pre-academic learning, language, writing, and problem solving/thinking skills, are all essential components of the special education curriculum. The use of computers in special education can enhance these areas of curriculum. The use of computers in special education can enhance these areas of instruction and provide teachers and children with new and exciting contexts for learning. Activities recommended for each curriculum area follow the INNOTEK teaching model.

PRE-ACADEMIC LEARNING

Pre-academic refers to the prerequisite skills that children need in order to learn academic subjects. Learning does not suddenly begin when a child reaches age six and enters school. During the preschool years, children engage in the learning process, mastering many skills, and acquiring the knowledge that is needed later for learning. The pre-academic areas of learning include understanding and using language, learning to attend, developing memory skills, and acquiring auditory and visual perceptual skills. Pre-academic skills also include recognizing and naming colors, letter recognition, number concepts, shape recognition, categorizing, and classifying.

Non-handicapped children often acquire pre-academic skills without special intervention before they enter school. Most children with disabilities, however, may need specific considerations to assure that they attain these essential pre-academic skills. The computer is uniquely equipped to assist young children in developing these abilities.

SAMPLE CLASSROOM ACTIVITY (COGNITIVE LEVEL 2—5)

Activity Name: Morning Song "Wash Your Face"

SKILLS

- Visual perception (picture object matching)
- Visual and tactile discrimination
- Expressive language
- Socialization

MAIN OBJECTIVES

- Provide opportunities for children to make choices
- Enhance visual discrimination and matching skills
- Encourage socialization and turntaking
- Encourage expressive language skills
- Enhance tactile discrimination skills

SOFTWARE DESCRIPTION

"Wash Your Face": Publisher, UCLA Early Intervention Program. The "Wash Your Face" program works in conjunction with the PowerPad and includes a picture overlay. The overlay separates the board into five areas that contain pictures representing five verses of the Morning Song. Each area activates the computer and allows the children to select a specific song verse. Once the children have selected a verse, an animated graphic of that verse appears and the computer sings the accompanying song.

PRE-COMPUTER PHASE

PURPOSE

The purpose of this phase is to introduce children to the "Morning Song" and to provide them with opportunities to use props/objects and imitate the actions of the song.

MATERIALS

2 Large toothbrushes
2 Washcloths
2 Combs
2 Plates, forks, and spoons
2 Paper dolls (with shirts, coats, or dresses)

ACTIVITIES

1. Teach children the "Morning Song" and include the physical actions to washing face, brushing teeth, etc.
2. Show children props and objects. Talk about what they are used for. Pass the props/objects around so the children can touch them and talk about their uses.
3. Pass out props/objects to individual children to use during the various verses of the song. When the "brushing teeth" verse is sung ask the children holding toothbrushes to imitate the action.

EVALUATION

The effectiveness of this activity will be evaluated through informal observations made by the teacher of the children's ability to sing the song, recognize objects, follow directions, and imitate actions.

COMPUTER PHASE

PURPOSE

The purpose of this phase is to introduce the children to the PowerPad and computer, to provide the children with opportunities to make choices, to reinforce object/picture matching skills, and to enhance tactile discrimination skills in an interactive environment.

MATERIALS

Software: "Wash Your Face"

"Wash Your Face" overlay

PowerPad

Echo Speech synthesizer

2 Large toothbrushes

2 Washcloths

2 Combs

2 Plates, forks, and spoons

2 Paper dolls (with shirts, coats, or dresses)

Shoe box

ACTIVITIES

1. Select children to come to the computer in groups of three for the activity.
2. Show the PowerPad and overlay. Ask the children to match the props and objects to pictures by placing them on the PowerPad to animate the screen and make the computer sing a specific verse of the song. Do this for each picture.
3. Encourage the children to sing the song with the computer.
4. Ask the children to place the props in a box.
5. Have the children take turns naming a picture, pressing it on the PowerPad, and then finding it in the box by touch alone. If a child selects the object correctly he/she gets a counter. The child with the most counters at the end of the activity is the "morning song" winner for the day.

6. Repeat these activities until all the children have had two to four turns.

NOTE: Alphabet software programs that include graphics and animation can be used for this activity also. Children could match objects to pictures on the computer screen instead of the touch pad.

EVALUATION

The effectiveness of the activities will be evaluated through a series of observations made by the teacher or the children's ability to match pictures to objects, to discriminate between objects using tactile skills, to control the computer by selecting specific pictures on the PowerPad and to take turns and cooperate with other children.

POST-COMPUTER PHASE

PURPOSE

The purpose of this phase is to reinforce object/picture matching, tactile discrimination, and social skills.

MATERIALS

Classroom objects (eraser, ball, scissors, crayon, block, clay, etc.)

Box

Picture/object lotto game

ACTIVITIES

1. Gather a group of classroom objects with various textures and shapes. Place the objects in a box. Do not let the children see the objects.
2. Give the children descriptive verbal clues for a specific object: "It is soft and squishy."
3. Choose one child from the group to find the object by feeling all the objects in the box. Children name the object/s that the child pulls out.
4. Provide children with additional activities that encourage object/picture matching (lotto, memory).

EVALUATION

The effectiveness of the activities will be evaluated through observations made by the teacher of the children's ability to use their tactile discrimination and object/picture matching skills. The teacher will also observe the children's ability to take turns and cooperate.

Source: Trieschmann, M. & Lerner, J. W. (1990). *Using the Computer to Teach Children with Special Needs: A guidebook of effective computer strategies.* Evanston, IL: National Lekotek Center.

COMPUTERS IN PRESCHOOL CLASSROOMS

OVERVIEW: This session provides curriculum strategies for using the computer in an integrated preschool classroom. The session is divided into two parts. Part one discusses and demonstrates pre- and post-lessons for computer activities. In Part two, the participants synthesize the information.

TIPS TO THE LEADER: This training session is divided into two sections. If time is limited, conclude with Part One. Part Two can be presented at a later date. Part Two can also be expanded. Teachers could develop worksheets for the most frequently used software programs in their preschool setting. Although we chose "Old MacDonald's Farm" for this activity, any other software program could be used. As this module expands concepts presented in Module 19, some of the handouts can be found in that module.

REQUIRED SKILLS: Participants are able to successfully start up a software program.

OBJECTIVES:

Part One: Pre- and post-computer activities

1. To list prerequisite skills necessary to successfully use a software program
2. To develop a pre-computer classroom activity for a preschool software program
3. To list two ways to modify a software program for preschoolers
4. To describe one way to introduce and use a software program with preschoolers
5. To list follow up activities to reinforce concepts presented in a software program

Part Two: Synthesis

6. To plan and develop appropriate activities to integrate software programs into a preschool curriculum

MATERIALS:

Hardware — for leader and each team:
    Apple IIe computer system with color monitor
    Power pad and cable
    Echo Speech Synthesizer

Software — for leader and each team:
    Variety of preschool software
    Old MacDonald's Farm (UCLA/LAUSD)

Handout Packet H-A1:
    H-19-1, Computer Activity Worksheet
    H-19-2, Completed Computer Activity Worksheet

Other Materials:

- Old MacDonald's Farm overlay
- Old MacDonald's Farm overlay cut up into individual pictures
- Related farm animal toys
- Flip chart or chalkboard
- Markers or chalk

KEY POINTS/ ACTIVITIES:

Part one: Pre- and post-computer activities

1. Prerequisite software skills

1a. Explain that many times we see the computer used by teachers as an isolated tool. Often activities and software programs do not relate to the current curriculum. To use the computer as a successful tool to enhance student learning, teachers must integrate computer activities into the curriculum.

1b. Using software with students is similar to using any other curriculum material. There are at least three steps in the teaching sequence; introduction, use, and follow-up or reinforcement.

H-19-1

1c. Distribute *Handout H-19-1, Computer Activities Worksheet*. This worksheet will be used by participants to record pre and post-computer activities during this presentation. Recommend that participants also use it to make relevant notes for future reference.

1d. Start up and use a software program such as "Old MacDonald's Farm". Ask the participants to list and discuss the skills required to run the software program. Guide them to include cognitive and language skills along with pre-computer skills for successful use. Record their responses on a flip chart or chalkboard.

2. Pre-computer classroom activities

2a. Once you have reviewed the software to determine the skills necessary to operate the program successfully, group them according to skill type. Activities need to be developed for each skill to assure that the child has mastered the skill before he can successfully use the software program.

2b. Discuss the need to design a pre-computer activity for a small group session that has goals parallel to the software program. Let participants suggest activities that are appropriate for "Old MacDonald's Farm." Guide the participants through the design by providing a lesson which incorporates like skills in a different format. For example, the use of objects and related pictures pertaining to the subject matter may enhance the understanding of presented concepts. Let the participants record their responses on the worksheet under the first section 'pre-computer' activities.

2c. Demonstrate a lesson that uses the pictures on the overlay, and corresponding toy animals within a lesson on animal sounds. Explain that this related classroom activity helps to assess existing skills of children.

3. Modifying software

3a. Explain that in addition to cognitive skills, one needs to examine the method of input. Children may need assistance in identifying function keys or pictures on an overlay. If using "Old MacDonald's Farm," demonstrate the use of the pictures on the cut up overlay.

3b. In some cases it may be necessary to modify the program or the input method. If the program offers editing options, examine each as to how they pertain to the students' language, cognitive, and motor skills. For example, "Old MacDonald's Farm" can be played on three levels: by exploring the overlay where a press results in that animal appearing on the screen, or by finding the animal that the computer requests or by identifying the animal that makes a particular sound.

3c. Suggest that if you can not modify the program to change the input method, you can create your own 'editing options'.

- When using an exploratory program, a mask showing only 10 letters of the alphabet could be used to limit the field of choices or for review.
- Making a paper overlay is also an easy process.
- Questioning techniques can simplify or challenge lessons.
- The use of alternate input devices via the Adaptive Firmware Card can simplify input for all children. For example, using two switches with the Multiple Switch Box, one as spacebar and one as return, eliminates the need for the standard keyboard.

4. Using computers in classroom activities.

4a. State that when using the computer in the classroom, thought needs to be given as to how the software program will be introduced and used. Educational goals need to be established. In addition, the computer can be used to encourage social skill building.

4b. Discuss ways of using computer activities in a preschool classroom. Some may include:

- Link pre-computer activities to the software program by using the same materials as cues or rewards.
- Encourage turn taking and joint problem solving, suggest that peers must agree before a key is selected.
- Use programs with printing options or the print-it button to make a hard copy of their work to provide reinforcement for follow up activities a copy of the activity to take home.

4c. Let participants suggest ways in which "Old MacDonald's Farm" could be used in the classroom. Have them complete the second section, "Computer Activities," on their worksheet.

5. Follow up activities: Suggestions

5a. Follow up activities can reinforce concepts presented during computer use. Let participants suggest follow up activities for "Old MacDonald's Farm."

H-19-2 5b. Distribute *Handout H-19-2, Completed Computer Activities Worksheet* to each participant. Discuss similarities of the activities on the handout and those just completed by the previous activity. Explain that this is a completed worksheet based on another piece of preschool software. Give them a few minutes to review the contents.

Part Two: Synthesis

6. Designing pre- and post-computer activities

6a. Instruct the participants to select a software program, review it, and use the form to record suggested activities.

6b. Allow time (15 minutes) for the participants to plan and develop appropriate activities that will integrate software programs into the curriculum. Make sure they include:

- assessing prerequisite skills
- developing pre-computer activities
- modifying the software program
- developing ways to introduce and use the software program
- developing follow up activities to reinforce concepts

6c. Reconvene the group. Sharing the results with the other teams would be beneficial for all.

CONCLUSION: This activity discusses perhaps one of the most difficult tasks for any teacher, the integration of software programs into the curriculum. Software programs are just like other curriculum material. Thoughtful planning for their success in the classroom must be addressed. Computer activities are best provided within the context of other classroom activities. Conclude by drawing participants attention to the worksheet. Emphasize the need for the development of pre- and post-computer activities. Field any questions.

REFERENCES: Osterman, G. B., Greig, C. & Kihan, L. (1987). *Sunburst Curriculum Planner.* Pleasantville, NY: Sunburst Communications.

Source: Preschool Integration Through Technology Systems. (PITTS), United Cerebral Palsy Association of Western New York, Inc., 4635 Union Rd., Buffalo, NY 14225; US DOE Grant #H024E80010.

THE PROCESS OF INTEGRATING SOFTWARE INTO THE SPECIAL EDUCATION CURRICULUM

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Introduction

When considering the effective use of technology, the term *integration* is often used. Indeed, the importance of integrating technology into the curriculum is frequently noted (Hanley, Appell, & Harris, 1988; Morocco & Zorfass, 1988; Panyan, Hummel, & Jackson, 1988; Royeen, 1988; Office of Technology Assessment, 1988). Despite the importance of this goal, integration is increasingly recognized as a complex endeavor.

Perspective Building

Integrating the computer into the classroom is hard work. In contrast, accommodating the computer in the classroom is easy. As a result, classrooms in which the computer has been accommodated are much more common than classrooms in which the computer has been integrated. However, only one method effectively uses technology to enhance learning.

ACCOMMODATING

In the classroom where the computer has been accommodated, students are able to use (syn. play) the computer when they have finished some specified work at their desk. The programs used at the computer are selected by the student. The teacher is satisfied with this arrangement for several reasons: it doesn't require additional planning time, it doesn't require a large software budget, it is motivating for students, and minimal demands are placed on the teacher regarding the skills and knowledge necessary to use the computer in this fashion.

To the casual observer, it is difficult to ascertain that the computer is simply being accommodated since the computer is being used and everyone concerned seems relatively satisfied with the arrangement. A much less costly ($200 vs. $1200) and much more motivational application of technology is the "Nintendo Response." That is, substitute a Nintendo System for the classroom microcomputer system.

Undoubtedly, this scenario is the result of a lack of attention to the integration process rather than a goal achieved by a deliberate and thoughtful plan.

INTEGRATING

The goal of integrating microcomputers into the curriculum is to link software and computer activities with specific instructional objectives in ways that facilitate teaching and learning. Three key concepts assist in operationalizing the goal of integrating software into the curriculum: curriculum correspondence, targets of difficulty, and stages of learning.

Curriculum Correspondence

The principle of *curriculum correspondence* provides an important framework for considering the effective integration of technology into the curriculum. Curriculum correspondence implies that there is a direct link between what the students are working on at their desk and what they do at the computer. Application of the principle of curriculum correspondence results in computer use that is focused, purposeful, manageable, and an enhanced ability for students to master specific instructional objectives.

Targets of Difficulty

Objectives that are especially troublesome for students to master may be referred to as *targets of difficulty* (Pogrow, 1988). These objectives come to mind quickly for experienced teachers because students have difficulty with these objectives day after day (and year after year). Because these objectives may be hard to learn, and perhaps hard to teach, they make suitable targets to consider when planning for the use of technology to enhance teaching and learning.

Stages of Learning

The third key concept to guide the effective integration of technology into the curriculum focuses on the instructional decision-making that a teacher follows in designing instructional experiences to enhance learning. Thus, the stage of learning has considerable implications for the type of software needed to assist students in learning:

Acquisition Stage
(The student will accurately learn a new skill)

Proficiency Stage
(The student will perform a task accurately and rapidly)

Maintenance Stage
(The student will continue to perform the task accurately and rapidly over time, even after formal instruction has been removed)

Generalization Stage
(The student will perform the learned task in new settings and situations)

Adaptation Stage
(The student will modify the learned task to meet their own needs and the demands of varying situations)

(Mindscape, 1988)

Overview

The model that follows was developed as a result of the following perceptions:

- Integration involves more than simply evaluating software (Smith & Vokurka, 1990)
- Considerable time, energy, and resources are necessary to successfully integrate technology into the curriculum
- Not all the tasks involved in integration are necessarily the primary responsibility of the teacher
- A number of stakeholders are involved in the successful integration of technology in special education programs
- Many integration models are based on system change and provide little guidance for motivated individuals to pursue the integration process on a classroom level

Thus, development of a model that described the various tasks involved in integrating software into the special education curriculum would (a) provide a planning guide for interested individuals, (b) serve as a tool for discussing the process among the major stakeholders, and (c) assist in the identification of methods and resources for facilitating the process.

The process outlined in *Figure 1* describes the major tasks involved in selecting, acquiring, implementing, and integrating software into the curriculum. The tasks appear to be generic in the sense that the process is the same regardless of ability level, subject matter, or type of computer. The process is divided into four phases which are comprised of three to four tasks which must be completed in working through the activities of a given phase.

The process is a somewhat linear progression of tasks involved in successfully integrating software into the special education curriculum. It is my impression that the process is recursive. That is, while phase one results in a comprehensive list of software programs which address a specific instructional objective, phases two, three, and four must be repeated with each new software program. Thus, it becomes readily apparent that this process involves a significant commitment of time and effort.

As a reasonable goal, it is suggested that teachers initially work through this process until they have found three to 10 programs which will support the varied needs of their students.

Figure 1

The Integration Process

PHASE 1	PHASE 2	PHASE 3	PHASE 4
SELECTION	ACQUISITION	IMPLEMENTATION	INTEGRATION
Planning	Previewing	Organizing	Linking
Locating	Evaluating	Teacher Training	Managing
Reviewing	Purchasing	Student Training	Extending
Deciding			

References

Hanley, T. V., Appell, L. S., & Harris, C. D. (1988). Technological innovation in the context of special education systems: A qualitative and structured research approach. *Journal of Special Education Technology, 9*(2), 98-108.

Mindscape. (1988). *Curiculum Methods for Mastery (or How to make education special for all learners).* Glenview, IL: Mindscape. 28-32.

Morocco, C. C. & Zorfass, J. M. (1988). Technology and transformation: A naturalistic study of special students and computers in middle school. *Journal of Special Education Technology, 9*(2), 88-97.

Office of Technology Assessment. (1988). *Power on! New tools for teaching and learning.* Washington, DC: U.S. Government Printing Office.

Panyan, M. V., Hummel, J., & Jackson, L. B. (1988). The integration of technology in the curriculum. *Journal of Special Education Technology, 9*(2), 109-119.

Pogrow, S. (1988, April/May). How to use computers to truly enhance learning. *Electronic Learning*, 6-7.

Royeen, C. B. (1988). Investigations into technology integration for the education of handicapped students. *Journal of Special Education Technology, 9*(2), 87.

Smith, R. & Vokurka, J. F. (1990). A software selection model for the special student. *The Computing Teacher, 17*(5), 36-38.

THE PROCESS OF INTEGRATING SOFTWARE INTO THE SPECIAL EDUCATION CURRICULUM

Phase 1 SELECTION			
Planning	**Locating**	**Reviewing**	**Deciding**

Overview

The tasks involved in this phase of the integration process focus on planning for the use of software to enhance teaching and learning. These tasks can be completed cooperatively with other colleagues in a school or district in the context of program planning or a curriculum review committee. (In contrast, each of the following phases and tasks will need to be repeated with each program identified.) Upon completion of phase one, teachers will have a comprehensive, prioritized list of programs that support the teaching and learning of a specific instructional objective. This information will then be used to guide the acquisition phase.

TASK: Planning

OVERVIEW: This task challenges special educators to articulate their rationale for using computers and their curriculum priorities. The result will be a clear statement regarding the planned uses of microcomputers in the curriculum which reflects the needs of the students and priorities of the teacher.

MAJOR STAKEHOLDERS: Students, Teachers, Administrators, Teacher Educators, State Department, Researchers, Technology Specialists, Software Publishers, Resource Centers

Key Questions to Address

- Why should students be using computers?
- What instructional goals could be facilitated by using educational software?
- What unique attributes of educational software make it desirable for teaching selected instructional objectives with software instead of using other methods and materials?
- Given a list of topics to be taught using computers, what priorities will be established?
- How many computers (will be/are) available?
- How much time will be available to each student expected to use the computer?
- Will the nature of students' handicapping conditions require special hardware?
- Will special software be required in order to fully utilize special hardware?
- What standards will be used to identify high-quality software?

Implementation Strategies

Planning for the use of technology in the classroom may be conducted in three different formats:

- Program Planning among a group of teachers working with students with similar needs
- Personal Planning by a teacher focusing exclusively on his/her students and classroom
- Student Planning by a teacher that must consider individual special needs

Note the planning forms in the Resource section.

Formalization of the statements and planning guides developed in this task provide an excellent rationale when seeking additional funding for a microcomputer instructional program.

Resources

See Resource Appendix pp. 21-22 for planning guides.

Technology in special education: A guide to district planning. Contact Dr. R. Hunt Riegel, Project ACCESS, 33500 Van Born Road, Wayne, MI 48184; 313/467-1490.

Male, M. (1988). Integrating computer use into IEP goals and objectives. *Special Magic*, Mountain View, CA: Mayfield, pp. 154-164.

Russell, S. (1986). But what are they learning? The dilemma of using microcomputers in special education. *Learning Disability Quarterly*, 9, 100-104.

TASK: Locating

OVERVIEW: The effort involved in this task is focused on conducting software searches to locate programs which can be used to enhance the teaching and learning of an objective. The goal is to produce a comprehensive listing of potential programs for each objective identified.

MAJOR STAKEHOLDERS: Technology Specialists, Software Publishers, Resource Centers

Key Questions to Address

- How do I find the kind of software I need?
- What local resources are available to assist me in locating appropriate software?
- What other resources are available to assist me in this task?

Implementation Strategies

This task acknowledges the fact that if computers are to be used regularly and productively, then one or more of the following options must be used to supply a computer with a steady diet of software:

Sources of Software

- Write your own programs
- Buy commercial programs
- Acquire free public domain programs

The use of programs which allow a teacher to author the instructional content and control other variables within a program are essential tools for the special educator.

Resources

See Resource Appendix pp. 23-26 for Fact Sheet 105, "Resources for Locating Information About Microcomputer Software."

TASK: Reviewing

OVERVIEW: The task of reviewing seeks to use published reviews and personal recommendations to prioritize the list of software programs identified from the software searches. The outcome of this task is a prioritized list which will guide the subsequent tasks.

MAJOR STAKEHOLDERS: Technology Specialists, Software Publishers, Resource Centers

Key Questions to Address

- How can I learn more about a specific program?
- Have any of my colleagues used these programs?
- Are there programs which are highly recommended by others?
- Can I eliminate any programs from further consideration?

Implementation Strategies

Conducting an extensive evaluation and preparing a review is a time-consuming project. This task seeks to use readily available information to assist in prioritizing a list of programs before conducting a personal review.

A positive published review or a glowing personal recommendation cannot guarantee that a program will meet your needs or expectations.

Be aware that the entire process of software review and evaluation has an inherent bias of subjectivity built into it. Thus, what one teacher may consider excellent may be viewed by a second teacher as unacceptable for his/her purposes. Consider the recommendations of others as a probability statement: If they like it, there is a high probability you will also like it. (Note that a high probability is not the same thing as a guarantee!)

Resources

ConnSENSE Bulletin. Published by the Special Education Resource Center, 25 Industrial Park Road, Middletown, CT 06457-1520; 203/486-0172.

Only the best: The discriminating software guide for preschool-grade 12 (1990 Edition). Available from R. R. Bowker, P.O. Box 762, New York, NY 10011; 800/521-8110.

Malouf, D. B., Morariv, T., Coulson, D. E., & Maiden, V. S. (1989). Special education teachers' preferences for sources of software evaluation information. *Journal of Special Education Technology, 9*(3), 144-155.

TASK: Deciding

OVERVIEW: This task utilizes the prioritized list previously developed to decide which programs to personally preview. A decision to preview one, three, or five programs completes the selection phase and moves the process into the task of previewing in the acquisition phase.

MAJOR STAKEHOLDERS: Teachers

Key Questions to Address

- Will the programs I have tentatively identified work on my equipment?
- Based on the information available to me, which program(s) tentatively appear to meet my needs, within my budget?
- How many of the top ranked programs on my list should I preview?

Implementation Strategies

The decisions made here about software are only tentative. Purchasing decisions will be made later after previewing and evaluating one or more programs.

This task marks the beginning of a loop between deciding-previewing-evaluating. The tasks of this loop are ongoing until a suitable program is identified.

THE PROCESS OF INTEGRATING SOFTWARE INTO THE SPECIAL EDUCATION CURRICULUM

Phase 2 ACQUISITION		
Previewing	**Evaluating**	**Purchasing**

Overview

The tasks involved in this phase of the integration process focus on acquiring and personally reviewing software programs for the purpose of assessing whether or not a program will meet the needs and expectations of the teacher and students. Successful evaluation results in a decision to purchase a program and the integration process moves into the integration phase.

TASK: Previewing

OVERVIEW: This task is directed at obtaining a specific software program for the purpose of examining it first-hand, prior to purchasing it, to determine whether or not it will meet one's needs and expectations. This process allows a user to "try out" and "test" a program before actually purchasing it.

MAJOR STAKEHOLDERS: Teachers, Administrators, Software Publishers, Resource Centers

Key Questions to Address

- Do I have all the necessary information to place a preview order?
- What should I know about ordering a program for preview?
- What should I consider if a program can be ordered from more than one source?

Implementation Strategies

Sometimes it is possible to arrange for a vendor to demonstrate a program at your school or during a conference. While this can be exceedingly helpful, reserve time for your personal review.

If a company is unable to arrange for a program to be mailed on preview, inquire whether a free demonstration disk is available.

Resources

Consider the following examples of several preview policies:

MECC — All orders must be pre-paid. 30 day satisfaction guaranteed.

Scholastic — Every product in this catalog can be examined in your school free for 30 days. If you're not satisfied, simply return the software to us in resaleable condition within 30 days and you'll pay absolutely nothing.

Sunburst — Free! 30 day classroom trial.

DLM — Orders from recognized educational institutions may be accompanied by a purchase order and will be billed, net 30 days, to the same address unless otherwise specified.

TASK: Evaluating

OVERVIEW: A formal or informal evaluation is conducted to determine whether or not a program will meet one's needs and expectations and whether or not the program should be purchased.

MAJOR STAKEHOLDERS: Students, Teachers

Key Questions to Address

- Once a program arrives, how do I determine if it is instructionally sound?
- What reactions do my students have to the program?
- How well does the program meet my original objectives and expectations?
- Does the documentation contain useful information to assist me in integrating this program into the curriculum?

Implementation Strategies

Upon receiving a program for preview, give it to a student for 15 minutes. At the end of that time, have the student demonstrate how it works. This "try-out" should give you an indication of the program's ease of use.

Design a student software evaluation form that provides students with an opportunity for writing about their thoughts after a preview experience.

While software evaluation forms can be helpful (see References listed under Resources), consider using them as a guide for what to look at in a program. Remember, evaluation is a subjective process and an evaluation form doesn't make it any less so.

A negative evaluation will require a teacher to re-examine the prioritized software list and continue the loop of deciding-previewing-evaluating until an appropriate program is identified.

Resources

Hagen, D. (1984). Microcomputer resource book for special education. Reston, VA: Reston Publishing.

Taber, F. (1987). Software evaluation and development. In J. D. Lindsey (ed.), *Computers and Exceptional Individuals*. Columbus, OH: Merrill, pp. 249-268.

Test, D. W. (1985). Evaluating educational software for the microcomputer. *Journal of Special Education Technology*, 7(1), 37-46.

TASK: Purchasing

OVERVIEW: This task involves the clerical and administrative aspects of purchasing a program. Upon completion of this task a teacher or district owns a specific program which has been selected to enhance teaching and learning of a specific objective.

MAJOR STAKEHOLDERS: Administrators, Software Publishers

Key Questions to Address

- What factors should be considered in deciding to purchase or return a software program?
- Is it possible (or necessary) to purchase multiple copies or a site license?
- What should I know about the replacement policy?
- How do I become a registered owner?
- How much time will lapse between when a program is ordered and when it will be available for use in the classroom?

Implementation Strategies

One important factor to consider when purchasing a program is whether or not training and technical support will be available after the sale (e.g., purchasing a program locally vs. purchasing it through a mail order company).

THE PROCESS OF INTEGRATING SOFTWARE INTO THE SPECIAL EDUCATION CURRICULUM

Phase 3 IMPLEMENTATION		
Organizing	Teacher Training	Student Training

Overview

The tasks involved in this phase of the integration process focus on cataloging and processing a newly purchased program and providing teachers and students with the necessary training to fully utilize a program. After teachers and students have a working knowledge of a program, the integration process moves into the final phase: integration.

TASK: Organizing

OVERVIEW: Software which has been purchased for school or classroom use must be inventoried and organized. While this task is clerical in nature, it is essential to the management of a software collection.

MAJOR STAKEHOLDERS: Administrators, Technology Specialists

Key Questions to Address

- Will software be stored in a central collection or will each classroom have its own software collection?
- How do I store my software and the related documentation?
- How can I organize my software collection?
- What can I do to make it easy for my students to use the software in our collection?

Implementation Strategies

Many present software storage and cataloging systems fail to provide teachers with sufficient information by which to determine whether or not a program may be useful to his or her students.

The use of a database to organize information about a software collection allows the information to be formatted in a variety of reports to meet the distinct needs of administrators, teachers, and technology specialists.

The organization of software within the classroom must be clearly understood by students so that little time is wasted looking for a program. Enlist their help in maintaining the organization of the software collection.

Resources

See Resource Appendix p. 27 for an example of a software database and four useful reports which profile the software in meaningful formats for inventory, ready-reference, and instructional decision making.

TASK: Teacher Training

OVERVIEW: This task focuses on providing training to both teachers and staff so that the program's objectives are clearly understood, mechanical operation of the program is mastered, and instructional strategies for using a program are outlined.

MAJOR STAKEHOLDERS: Students, Teachers, Administrators, Teacher Educators, State Department, Researchers, Technology Specialists, Software Publishers, Resource Centers

Key Questions to Address

- What are the major objectives of the program?
- What prerequisite skills and knowledge are required to use the program?
- Have I mastered the mechanics of using the program?
- Will special instructional strategies be required for students to successfully use the program?
- What instructional strategies will facilitate the use of the program?

Implementation Strategies

Unfortunately, the only training available for most educational programs comes in the form of reading the documentation and trying to use the program. This form of self-teaching works well some of the time, but can be particulaly frustrating with a powerful (sny. complex) program. In such cases, it's helpful to find a workshop where you can be trained on how to use the program.

This may be a useful time to return to colleagues and friends if they originally recommended a program. Sometimes the experience shared in a simple demonstration will save hours of frustration.

Software that is very easy to use often means that you don't have to read the manual to begin using a program. In fact, there seems to be an unwritten law: The less I have to use the instructional manual, the more I like the program. Software which incorporates this thinking is easy to use in the classroom (e.g., Print Shop).

Resources

Several companies prepare extremely helpful quick start-up sheets (e.g., Sunburst, Davidson, The Learning Company, Advanced Ideas).

See Resource Appendix pp. 28-29 for an example of a start-up sheet.

TASK: Student Training

OVERVIEW: This task recognizes the need for students to be trained on how to use a program. The goal is for students to be able to find and operate a program so that the time spent at the computer is primarily learning time.

MAJOR STAKEHOLDERS: Students, Teachers

Key Questions to Address

- Have I mastered the mechanics of operating the program?
- Do I have the necessary skills to successfully use the program?
- Can I use the program independently?

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Implementation Strategies

Some software programs will include materials to train students on the mechanics and concepts involved in using a program. Needless to say, these programs are preferable to those which require the teacher to create the training materials.

Training that ensures students have a high degree of success in the mechanics of using a program means that students will spend more time with the program's content.

Creating quick start-up sheets, guides of strategies and tips, and summaries of key commands will aid this process. It may be useful to place other references (dictionaries, thesauri, etc.) nearby as well.

Are there other cognitive adaptions which will enhance students' ability to independently and successfully operate a program?

THE PROCESS OF INTEGRATING SOFTWARE INTO THE SPECIAL EDUCATION CURRICULUM

Phase 4 INTEGRATION		
Linking	**Managing**	**Extending**

Overview

The tasks involved in this final phase of the integration process focus on using software in the classroom to enhance teaching and learning. Considerable time and effort has been expended to reach this phase. However, this is the phase where we see the fruits of our labor.

TASK: Linking

OVERVIEW: This task focuses on linking software with specific instructional objectives which are taught throughout the school year. For example, a program about punctuation is most effective when discussing that chapter in the English text — not two weeks later.

MAJOR STAKEHOLDERS: Teachers, Teacher Educators

Key Questions to Address

- When should the program be used so that it corresponds with the existing curriculum?
- How can the program be best used to facilitate learning?
- What activities would be useful both prior and subsequent to a program's use by students?

Implementation Strategies

Use a small planning calendar to record your use of various software programs. At the end of the year, this calendar will provide some overall information about how you used your computer during the year. Next year you can continue to refine your personal integration plan.

Resources

Sales, G. C., Carrier, C. A., & Glenn, A. D. (1986). Evaluating lessons that use computers. *The Computing Teacher, 13*(8), 46-48.

TASK: Managing

OVERVIEW: This task essentially involves managing computer activities within the instructional environment. Whether the computer is in the classroom or in a lab, the teacher manages and facilitates computer use and pre/post-computer instructional activities.

MAJOR STAKEHOLDERS: Students, Teachers, Teacher Educators, Researchers

Key Questions to Address

- How can I provide time for all students to use the program?
- How do I ensure that all students are successfully achieving the objectives of the program?
- What other materials should be made available at the computer?

Implementation Strategies

Phillips (1983) outlines the following management strategies:

Total Class Instruction
Timed-Use Relay
Block-Time Format
Non-Scheduled Format

Dockterman (1989) describes the following models for using the computer one-computer classroom:

Smart Chalkboard
Discussion Generator
Group Activator
Discovery Tool
Teacher Secretary

Resources

Phillips, W. R. (1983). How to manage effectively with twenty-five and one computer. *The Computing Teacher,* March, p. 36.

Dockterman, D. (1989). *Teaching in the one computer classroom.* NY: Harper & Row.

Rieth, H., Bahr, C., Polsgroe, L., Okolo, C., & Eckert, R. (1987). The effects of microcomputers on the secondary special education classroom. *Journal of Special Education Technology, 8*(4), 36-45.

TASK: Extending

OVERVIEW: At this point, teachers have acquired a software program, judged it to be of sufficient quality, learned how to use it, and taught students how to use it. Now what? This task focuses on identifying additional uses of a program in order to maximize the efforts involved in selecting, acquiring, and implementing a program.

MAJOR STAKEHOLDERS: Teachers, Teacher Educators, Researchers, Technology Specialists, Software Publishers, Resource Centers

Key Questions to Address

- How can I extend the shelf life of a program? That is, how can I continue to use a program in ways that facilitate other instructional objectives?
- When would be an appropriate time to reschedule the use of a program as a probe for the maintenance of skills?

Implementation Strategies

Be on the lookout for creative ideas from your colleagues, at professional meetings, and in your professional literature. Also, if you use software from any of the following companies, you might want to contact them to receive their newsletters. Each issue contains ideas from other teachers on how they use specific programs:

Mindscape
Sunburst
Teacher Support
Tom Snyder

Resources

1988 Special Education Lesson Plan Contest. Computer Learning Foundation, P.O. Box 60400, Palo Alto, CA 94306-0400.

National Unicorn User's Group, 6331 Fairmount Avenue, Suite 332, El Cerrito, CA 94530; 415/528-0674.

Wedman, J. F. (1986). Making software more useful. *The Computing Teacher, 14*(3), 11-14.

SOFTWARE INTEGRATION PLANNING FORM

Teacher's Name ______________________ Date __________

Number	Curriculum Area	Major Objectives	Program Name (Publisher)
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

PROGRAM PLANNING

Instructional Goal:

Objectives:

Strategies:

Software Required to Support the Plan:

STUDENT PLANNING FORM

Curriculum Area	Goals	Hardware Requirements	Software in Existing Collection	Potential Software to Review
	1.			
	2.			
	3.			

RESOURCES FOR LOCATING INFORMATION ABOUT MICROCOMPUTER SOFTWARE

Fact Sheet 105

Looking for new software to use in your classroom? However ...

> "... I don't have a lot of time to prepare my software purchase order."
>
> "... I don't have much money for software, so I want to be sure I spend it wisely."
>
> "... The last time I bought software programs I ordered them based on the catalog description. When the programs arrived, they were hardly like the original descriptions. Now they just sit on the shelf."

If any of these statements sound familiar, you'll find this fact sheet useful for identifying a variety of resources which will assist you in locating appropriate microcomputer software. This fact sheet is organized around seven sections:

1. Comprehensive Resources
2. Focusing the Search to Find a Few Good Programs
3. Software Which Corresponds to the Curriculum
4. Special Needs Software
5. Sources of Public Domain Software
6. Periodicals Which Monitor New Software
7. Other Information Sources

Except where noted, all resources include software information for common microcomputers. The prices do not include shipping and handling.

1. Comprehensive Resources

The first type of resource to consider when looking for software is a comprehensive reference. These sources provide detailed information on programs in a variety of subject areas and grade levels.

> The Educational Software Selector (TESS), 1986-87 (3rd edition), $59.95 and The 1988 Supplement, $29.95.
> *Available from: EPIE, P.O. Box 839, Water Mill, NY 11976; 516/283-4922*

The 3rd Edition of TESS contains detailed descriptions of over 7,700 programs for all types of microcomputers and subject areas. When possible, evaluation information from published reviews is included.

The 1988 supplement describes an additional 3,000 programs and includes a list of 350 highly rated software programs. Multiple indexes make these sources easy to use.

> Software for the Schools 1987-88, A Comprehensive Directory of Educational Software Grades Pre-K through 12, $49.95.
> *Available from: R. R. Bowker, P.O. Box 762, New York, NY 10011; 800/521-8110*

This book is in its first edition and is similar in function to TESS. Indexes are available by computer and subject area. Programs are listed in alphabetical order, and include information on price and publisher, each with a brief description. The hard cover makes it easier to handle than TESS, but TESS wins out when you need a complete description of a program.

2. Focusing the Search to Find a Few Good Programs

One of the drawbacks of a comprehensive software reference is that it quickly becomes apparent how many choices one may have. It is also difficult to ascertain the qualitative differences between so many programs. Hence, several tools have been developed to focus your attention on a few good programs worthy of your attention.

> Only the Best: The Discriminating Software Guide for Preschool-Grade 12 (1990 Edition), $26.95.
> *Available from: R. R. Bowker, P.O. Box 762, New York, NY 10011; 800/521-8110*

The editors compiled their software lists based on the results of published educational reviews of software. Programs which emerge from these national reviews with the highest possible score by three or more reviewers qualify as "Only the Best." (A list of "Nearly the Best" is also included.)

A cumulative edition, "Only the Best. The Cumulative Guide to the Highest Rated Educational Software, 1985-1989, Pre-School to Grade 12" is also available from R. R. Bowker for $49.95.

> 1989 Survey of Early Childhood Software, $19.95.
> *Available from: High/Scope Press, 600 N. River Street, Ypsilanti, MI 48198; 313/485-2000*

Here is a tool that could be considered a blending of TESS and Only the Best, specifically for teachers of young children. Contains complete descriptions of 355 programs and evaluative information on software for Apple, IBM, Commodore, Macintosh, and Atari. Published annually. This resource is a "must" for early childhood teachers.

3. Software Which Corresponds to the Curriculum

Effective use of computers implies that software corresponds to the curriculum. By beginning with a specific objective, the software search is focused, and the program ultimately selected will facilitate students' learning a particular objective.

Apple Access Curriculum Software Guides, $27.00 each.
- K-12 Science
- K-6 Mathematics
- 6-12 Mathematics
- K-6 Reading, Writing, Language Arts
- 6-12 Reading, Writing, Language Arts
- K-12 Social Studies

Apple Education Solution Guides, $24.00 each.
- English as a Second Language
- Foreign Language
- Business Education

Available through local Apple Dealers

These publications focus specifically on Apple software, but are particularly valuable to subject area teachers as well as special educators. Consider purchasing the appropriate guide when your district reviews each curricular area.

> IBM Directory of Educational Objectives and Networkable Software for K through Eight in Language Arts, Reading, and Math (June 1989).
> *Available free through authorized IBM educational representatives*

This booklet provides scope and sequence charts which link curricular objectives in language arts, reading, and mathematics to commercial software programs made by IBM and other vendors. One drawback to this tool is that detailed descriptions of the programs have been left out.

> Macintosh Educational Software Guide 1990, free
> *Available from: Apple Computer, Inc., 20525 Mariani Avenue, Cupertino, CA 95014; 408/996-1010*

The first edition of a book that provides scope and sequence charts which link curricular objectives in computer science, early learning, language arts, mathematics, science, social studies with commercial Macintosh educational software.

4. Special Needs Software

While the use of off-the-shelf software is desirable when possible, special software is often necessary for (a) teaching concepts not usually found in the mainstream curriculum (e.g., cause and effect, sign language); (b) taking advantage of adaptive equipment (e.g., switch, speech synthesizer); or (c) students' cognitive abilities. The following resources are useful in locating software designed specifically for special education.

> Closing the Gap 1990 Resource Guide, $14.00.
> *Available from: Closing the Gap, P.O. Box 68, Henderson, MN 56044; 612/248-3294*

This is a comprehensive guide to the field of technology applications in special education. Published each February, this guide includes sections that address hardware, software, resources, and organizations. Annual subscription includes resource guide, and five other issues for $21.00.

> Apple Office of Special Education. (1990). Apple Computer Resources in Special Education and Rehabilitation, $19.95.
> *Available from: DLM, P.O. Box 4000, One DLM Park, Allen, TX 75002; 800/527-4747*

An invaluable reference to Apple-related hardware adaptations, software, and information sources relating to the use of technology by individuals with disabilities using Apple computers.

> Trace Resource Book: Assistive Technologies for Communication, Control and Computer Access, 1989-90 Edition, $49.00.
> *Available from: Trace Research & Development Center on Communication, Control & Computer Access for Disabled Individuals, S-151 Waisman Center, University of Wisconsin-Madison, 1500 Highland Avenue, Madison, WI 53705*

This single edition (789 pages) updates a previously issued four-volume series on communication aids, switches and environmental controls, and hardware and software. This is an authoritative reference to adaptive hardware and special needs software.

> The 1989-90 INNOTEK Software Resource Guide: A Guide for Selecting Software for Children with Special Needs, $20.00.
> *Available from: National Lekotek Center, 2100 Ridge Avenue, Evanston, IL 60204; 708/328-0001*

This new resource guide contains information on 190 carefully selected programs which have been used in INNOTEK programs with children with special needs, ages two to 14 years. Includes important information on each program's compatibility with adaptive devices. This is an excellent resource.

The Special Ware Directory, 2nd Edition, $22.50.
Available from: Onyx Press, North Central at Encanto, Phoenix, AZ 85004

While this book was published in 1986, it is still helpful in locating older software for special needs individuals. Software is indexed by handicapping condition, type of computer, and subject areas.

5. Sources of Public Domain Software

Public Domain software is a good value for the price. While there is no shortage of sources of public domain software, considerable time and energy may be required to review and select programs which have educational value. The following vendors have expressed interest in identifying and disseminating low cost educational software.

A Source of Apple Public Domain Software

CUE Softswap
P.O. Box 271704
Concord, CA 94527
415/685-7289

A Source of IBM Public Domain Software

PC-SIG, Inc.
1030 E. Duane Avenue, Suite D
Sunnyvale, CA 94086
800/245-6717

A Source of Macintosh Public Domain Software

EDUCORP
531 Stevens Avenue, #B
Solana Beach, CA 92075
800/843-9497

6. Periodicals Which Monitor New Software

One inherent problem with software reference tools is that they are unable to monitor new software developments to produce them. Thus, it is important to regularly review selected periodicals to stay informed of new developments, programs, etc. Some periodicals that special educators find useful include:

Apple II
inCider
Apple II GS Buyers Guide

IBM
PC Computing
PC Magazine

Macintosh
Mac User
Mac World

General
Classroom Computer Learning
Teaching and Computers
The Computing Teacher

7. Other Information Sources

Colleagues, professional journals, computer user groups, and local computer stores are examples of the vast number of other resources which can provide information on software. Finally, for those with access to telecommunications, Apple can be contacted via SpecialNet (user name APPLE.OSEP) or via AppleLink. IBM can also be contacted via SpecialNet (user name IBM.LINK) or by phone at the National Support Center for Persons with Disabilities (800/IBM-2133) or the IBM/Special Needs Exchange (703/439-1492).

This fact sheet was written by Dave L. Edyburn, Ph.D., as part of the ongoing efforts of the Missouri Technology Center for Special Education to provide special educators with pertinent information regarding technology and its application for students in special education. The Missouri Technology Center for Special Education, located in the School of Education at the University of Missouri-Kansas City, is a state-wide technology support project funded by the Department of Elementary and Secondary Education, Division of Special Education.

Technology Center for Special Education, University of Missouri-Kansas City, School of Education, Room 24, Kansas City, MO 64110-2499, 800/872-7066, 816/276-1040, SpecialNet User Name; MOUMKC.

THE LEARNING ENVIRONMENT

The child's degree of success in developing skills on the computer depends to a large extent on the learning environment. Among other things, the learning environment includes the area the computer occupies in the room, the child's position at the equipment, the method of input the child uses for the computer, and the teaching strategies implemented. "The Learning Environment" is devoted to helping you maximize the potential of the computer in your classroom.

This chapter is divided into three sections: birth to three, three to five, and severe handicapping conditions. Read each section, even though you may not work with children in each targeted area. Many suggestions in the birth to three section will be pertinent for older children functioning at lower levels. Some general recommendations which apply to all children have not been repeated in each section to avoid redundancy. For example, care and storage of equipment is discussed in detail in the section on the child with severe disabilities, but the suggestions apply for equipment used with all children.

Equipment Recommendations

Certain pieces of equipment can greatly improve the effectiveness of the computer station. Suggestions for children with severe or multiple disabilities are indicated. The following is certainly not inclusive, but serves as a good starting point.

1. **Computer cart on wheels:** For most children who use wheelchairs, a "standard" computer cart can be used to provide eye level placement for the monitor since many have adjusting table and shelf height. Depending on the size of the wheelchair, the top shelf of the cart may need to be removed entirely.
2. **Smaller table with chair:** Ambulatory children may need a different size table for appropriate computer/monitor placement. Their feet should touch the floor comfortably when they are using the computer. If the keyboard is not used, an input device and the monitor may be placed on the table without the keyboard to reduce extra stimuli.
3. **Surge protector:** Many schools are located in older buildings which have non-grounded plugs. Some schools may have three-pronged outlets without correct grounding. To protect the equipment from electrical damage, purchase a surge protector. Price range from $10 to over $100 depending on customized features.
4. **Power strip:** Some power strips will protect the equipment from electrical surges as well as provide additional outlets.
5. **Disk storage box:** A twenty-five to fifty disk storage box will provide adequate space for the software which can be organized a number of ways within the file depending on the computer expertise of the staff. Disks may be arranged according to which children use them. This way, the staff can simply look for a child's name, select the program, and use it with little assistance. If the staff is fairly new to computer use with children, put a "cheat sheet" in the software box with the program which includes a list of the peripherals required, an outline of the instructions for use, and specific teaching instructions or applications for each individual child. You could also reduce pictures of the input devices and the keyboard on the photocopy machine and copy them on a full sheet adhesive label. Cut out the appropriate pictures and use them as icons on the disk envelope. If the keyboard is used, color appropriate keys on the keyboard icon which operate the program.

6. **Dot matrix printer:** Most dot matrix printers print both graphics and text. The Image Writer II is capable of printing in color. Children who do not have the motor capability to draw on paper can use drawing programs and print their drawings to take home. Children using augmentative communication programs can write short notes to family members (depending on the software used). Teachers can write IEP's, design calendars and newsletters, and use the computer for other record keeping tasks. Record keeping software with a hard copy print out option can provide useful documentation for measuring skill mastery.
7. **Various adaptive plugs and jacks:** Some simple circuit devices to consider for classroom use are: (1) a switch extender (a length of wire to allow a child with physical disabilities to reach the interface box with relative ease), (2) double plugs to one jack adaptor (allows the child to operate two devices with a single switch press), and (3) double jacks to one plug (allows two children to operate the same toy or computer program).
8. **Switch interface:** Several companies make switch interface boxes which enable single switch users to use the computer without the keyboard. Note that the software must also be written specifically for single switch use or operate with the Open/Closed Apple keys (on the Apple IIGS, the Open Apple/Option keys). An Adaptive Firmware Card, versatile for single switch access, may be a consideration if most of the children in the classroom are single switch users.
9. **Clamps, tape, or other securing devices:** The keyboard, switch, or other input device should be placed in a secure manner, be stable, and not hamper or distract the child from his objective.

THE CHILD: BIRTH TO THREE

Environment plays an important role in the outcome of a curriculum activity for the very young child with special needs. Factors which can affect his level of response include switch type and placement, body position, location of the monitor or toy, room lighting, acoustics, and distractions. Input from parents and support professionals, such as physical therapists, vision and hearing specialists, occupational therapists, speech/language specialists, and physicians is essential in the consideration of environmental factors.

Child Positioning

The position of the child's body and the placement of the equipment are the two most critical factors affecting the level and duration of the child's response. Without proper positioning and placement, children are unable to initiate control over any aspect of their environment. Early sensory perception and cognitive development are affected by the child's position. Input from a physical therapist is essential in determining whether the child needs to be placed prone over a roll on the floor, in a chair, or in another position. Infants and toddlers have a strong need for stability and predictability in their environments. The consistency, comfort, and stability of their positions should allow them to concentrate on the activity. See the section on "Positioning Strategies" in the "Severe Disabilities" section.

Switch Determination

Determining the appropriate switch type is also an important factor to consider in conjunction with body positioning. To determine the type of switch the child can control with the greatest ease, begin by examining the child's present physical abilities for the most reliable body movements. Because switches vary in design and effort needed to activate them, the child's most reliable movements will be deciding factors as the choice for a switch (ribbon, leaf, tread, plate, or blow, for example) is made. Another factor to consider is the child's current concept of cause and effect. During initial stages of cognitive development, a switch which is activated by the least amount of pressure will help the child begin to realize his own role in causing the result. For more information on switches, see the switch section in this curriculum guide. Refer to Macomb Projects' Microapplication videotape and manual, **Constructing A Battery Interrupter and Tread Switch** for information about constructing inexpensive switches, battery interrupters, switch interfaces, and other connecters.

Placement of Equipment

During initial switch activities with toys, present the switch in a position accessible to the child. When focusing on a single auditory stimulus — music, for example — it may be desirable to place the source of the sound out of the child's visual field, so that s/he concentrates only on the switch. When the switch is pressed, an auditory response is heard without any visual distraction. Choosing what to present in the child's immediate environment depends on his ability to focus on varying amounts of stimuli. For instance, if it is appropriate to present a moving toy to the child, the toy should stay within the child's visual field so that he does not lose track of it and become frustrated.

The switch should be held firmly in place (easily accessible to the child but not activated by the child in his "resting" position). It should not move (shift) when activated by the child.

When using single switch software, present only the monitor and switch in the immediate environment. Because young children love color and colorful software is exciting and attention-grabbing, a color monitor is more effective for them. With a long video cord for the monitor and an extension connection for the switch, the monitor and switch can be moved to a separate area from the keyboard, the disk drives, and the computer. By seeing only the monitor and switch, the child more readily associates the switch press to the response on the monitor and is not confused by such factors as the "reading" light on the disk drive.

This same principle also applies when other peripherals are the focus of the activity. When using the PowerPad™, present the PowerPad™ and the monitor to the child. In a small group activity, center the pad on a low table within reach of all the children with the monitor placed toward the back of the table. Or consider seating the children on the floor and placing the monitor on the floor or on a low table nearby. The PowerPad™ can be passed among the children.

Monitor placement is an important factor whether a switch or the keyboard is being used for a computer activity. The monitor should be placed at a comfortable eye level for the child. If he is required to hold his head back, to look up at the monitor, he will tire quickly and will not be able to perform optimally. When an activity is conducted with a small group of children, consider the height of the monitor in relation to the children's eye level and place equipment so children can concentrate on the activity rather than on their discomfort caused by improper body positioning or equipment placement.

Limiting Room Distractions

Keep the room setting for any activity as familiar and natural as possible. If you are conducting home visits, the parent should help you choose an appropriate location in the home which can be consistently used for the child's activities. It is easy to overlook details like background noises, so if the focus of the activity is auditory stimulus received from a tape recorder, toy, or software program, pay particular attention to the noises in the home. The young child may have difficulty focusing on the source of the sound if he is receiving constant noise from the environment. Even though sounds from a radio or television seem to be a natural part of the environment, overlooked in setting up an activity for the child, these same sounds compete with the auditory stimulus of the activity. When sessions are conducted in a large room, such as a church or community center basement, at a center-based program, poor acoustics contribute to noise distractions. It may be difficult for a child to determine the source of the sound when it appears to be surrounding him in a large room. Placing dividers in the room so that the immediate environment is more confined may help him to concentrate on the sensory component of the activity.

When the activity centers on a visual stimulus, consider the amount of visual distractions in the child's immediate environment. To determine what the child is able to see at a certain level, place yourself at the same level as the child. Darken the room slightly on a sunny day by closing the curtains to help the child focus on a lighted toy or to reduce glare on the monitor.

Summary

Obtaining information from the parents and support professionals who work with the child helps ensure an effective environmental design. Consider the child's position, most reliable body movements, resting position, physical abilities, sensory awareness, and level of cognitive development. The parents and professionals who know the child can provide you with information that would take hours of personal observation to gain.

Keep toys, switches, and other equipment in the visual field to a minimum to avoid confusing the child, place equipment with the comfort of the child in mind, and use switches that are easy for the child to operate. Always use a color monitor with a young child since it holds the child's attention more effectively than a monochrome monitor.

Integrating these environmental factors will determine the degree to which a child is able to respond, and controlling these "built in's" will have a great impact on the child's ability to succeed. Through continuous assessment of the child's physical and mental capabilities and of environmental factors, you can provide progressive opportunities to help the child achieve developmental skills.

THE CHILD: THREE TO FIVE

Setting up a learning environment for the preschool child with special needs is an important aspect of organizing a computer activity. **Building ACTTive Futures** uses a problem-solving approach with preschoolers ages three to five to stimulate their general thinking skills. This approach requires careful planning. The ideal environment is arranged so the child discovers ideas and develops theories for ideas on his own; it is organized to allow the child some instant success (a software program, where any key press on the computer elicits a response on the monitor) and then to challenge the child's thinking skills by offering a preselected variety of options.

An introduction to ideas for problem-solving strategies, teaching techniques, and the value of computer and computer-related activities is included in this section.

Physical Considerations

Before you actually begin using the computer in your program, consider the environmental design. The computer center within the classroom should be a safe, pleasant place for children. Whether the computer is in the classroom daily or access is on a rotating basis, the set-up of the equipment requires some planning. To set up the computer center:

1. Place the computer against a wall near an outlet and tape cords securely to the floor to avoid accidents.
2. Use a surge suppressor to protect the computer from voltage surges which can damage hardware and erase memory.
3. Place the computer away from direct sunlight. Floppy disks and computer chips can be damaged by direct sunlight and extremes in temperature.
4. Select a low traffic area for the computer center. This area should be well defined, allowing the teacher to see what is going on, but limiting distractions for the child.
5. Place the computer on a table without a rug beneath it or use carpeting approved for use with computers (containing copper in the backing) to avoid static electricity which can cause your computer or software to operate unpredictably.
6. Place the computer on a low table for the children. Sometimes you will want to place the monitor on the floor.
7. Adjust the height of the monitor to a comfortable angle for the child. This may mean special adjustment for a child in a wheelchair or adaptive seating device.
8. Have an index file close to the computer center for keeping track of the goals being targeted, the level the child is working on in a specific software program, and any adaptive equipment a child requires.
9. Keep software in protective disk envelopes and closable disk containers away from direct sunlight and any type of magnetic field (including fans, motors, and even the monitor).
10. Place the equipment to allow free air circulation around and into the vents on the computer case.

To encourage the children to become familiar with the written words as well as to reinforce the word-object relationship, place the names of the computer parts on each component of the system. Discuss the rules (i.e., no food or drinks at the computer, no dirty hands) for the computer center and for disk handling with the children. Encourage children to draw pictures to illustrate one of the rules or instructions for operating the equipment; then post their pictures in the center. Reminders help foster the child's independent computer use.

Accessibility

Consider the computer as another classroom learning tool. Like books, dress-up clothes, blocks, paint, clay, scissors, and crayons, the computer provides its own impetus for learning. It is not a toy or game to be used for reward or punishment; rather, it is an integral part of the classroom that can provide a means for the young child to manipulate his environment to learn and discover information about his world. To deny a child the use of this equipment because he did not share on the playground or to use it as a reward fosters the view that the computer is an external reinforcer. In addition, using the computer in this manner enables only certain children — those who finish their work — to use this tool. However, it is often the children who do not finish their work who could benefit most from computer use.

Physical Design and Support Materials

Provide an interesting, approachable environment for the children in a defined area in the classroom. Low partitions such as bookshelves offer children using the computer center some limitations from outside distractions but still allow you to see what is going on in the center. Keep materials related to the computer activities on the shelves of the center. Support materials are necessary to allow children to examine in additional ways concepts (such as tallest, more, on top of, etc.) introduced in software programs. Transfer of a concept from two dimensional to three dimensional and back again develops the concept in children's minds. The more experiences the child has with each concept using as many senses as possible, the more concrete the concept becomes to the child.

Include in the computer center items such as paper dolls (make them any size, including life size with the FingerPrint Card and **Paper Dolls** or **Paper Dolls - Dress Me Too**), puzzles (make them using the FingerPrint Card and **Peanuts Picture Puzzlers**), a set of shapes, games (similar to the game board in **The Playroom**), blocks, colored beads, pencils and paper, an Etch-A-Sketch (the overlays developed for Etch-A-Sketch can be adhered to the monitor screen with poster putty and used with LOGO). Do screen dumps of favorite software programs and use these as patterns to reproduce the characters in a flannel board version of the story. As you become familiar with the software programs you are using, you will identify items that the children will find helpful for transferring and generalizing concepts from one experience to another.

Place the computer on a table or cart at the appropriate height for the child with the keyboard slightly higher than the child's elbows. In a mainstreamed classroom, use a table with adjustable legs which allow the table top to be raised or lowered to accommodate a child in a wheelchair. If your class shares a computer with older children, the cart will probably be too high. Move the computer to a child-sized work area so children will be comfortable as they work. Leave at least two chairs at the computer center and encourage children to work together to develop cooperative learning, language, and social skills.

Position the color monitor at eye-level and within reach so children can point to things without verbally expressing themselves in every instance. Consult a physical or occupational therapist regarding proper positioning of a child in a wheelchair or other apparatus and discuss with them possible input devices as alternatives if the child lacks the fine motor control the keyboard requires. If children don't need to access the keys, present them with the monitor and switch only. Move the computer away from the field of vision, but within your reach for easy access in case you need to reboot the program or boot up a different one. A long monitor cord and switch cable will give you the flexibility of putting the computer in one place and the monitor and switch in another.

From time to time, evaluate the computer center, considering the distractions present in and around it. Consider the classroom noise level and traffic paths, factors that can distract the child. You may need to move the computer center to a new location or plan less distracting activities for others working near the computer area. Children in other areas of the room may be distracted by noise from the computer center. Speech synthesis, music, and sound effects may be distracting to a child in the reading center. Consider all these factors when laying out the computer center and rearrange the room accordingly.

Make sure the center is a safe place to work. Are cords and peripherals tucked away when not in use? Is the electrical outlet safe? Are the disks protected in storage containers? Do you have a static electricity problem? What about magnetic fields? Some of these problems will be easier to overcome than others. Take precautions to safeguard both the children and the equipment.

Ways to Introduce the Computer Center

Introducing the new computer center to children can be accomplished in numerous ways. Teachers should point out and label each part of the equipment and explain how each part of the center is to be used; for instance, the computer is used to operate software and the shelves of material may be played with while others are using the computer. Children should assist in generating the rules; how many should be allowed in the computer area at one time, how many should use the software together (with teacher direction), what should happen if someone does not adhere to the rules, etc. When children help to formulate the rules, they are more likely to follow them. Initially the teacher may want to work with small groups in the center to teach operating procedures and to encourage group cooperation which will be needed as children work in pairs or groups of three or four. Other learning centers should be set up while the teacher spends time at the computer center. Children who demonstrate an understanding of how to use the computer or a particular piece of software may be asked in the future to assist other children who need help when they are at the computer without the teacher present. Children sometimes learn some features of the programs more quickly than the teacher.

Even when teachers are restricted to having the computer in their classroom two hours a day, an effective computer learning environment may be developed. The teacher will need to move the equipment from the generally approved "rolling computer cart," but with a little practice this can be done in five minutes or less. Although moving the equipment may be inconvenient, designing the computer learning environment to allow children to take more responsibility for their learning offers opportunities to develop thinking skills which are difficult to teach. Providing computer and related activities in the learning center, open access, and encouraging peer cooperation in small groups provide an impetus for learning for young children.

Organizational Patterns

Utilize computer time in the classroom most effectively by designing computer activities which can best be accomplished in small groups. Although it is tempting to load a computer program and send one child over to operate it because of its structural simplicity, this limits the computer's use to very few children. Using the computer in group situations requires a great amount of initial planning. To facilitate this process, curriculum objectives for the computer can be organized in the same way that other small group activities are organized. First, record each student's IEP (Individualized Education Plan) goals and group those children together whose goals are similar. Then select a program which can effectively help children to develop those skills. Using the computer with small groups of children also requires internal organization. Children should not always work within the same group; changing groups frequently encourages children to socialize more effectively with others. They begin to develop varying cooperative and adaptive social skills which generalize to other areas of the classroom. They learn more from others and begin to develop the understanding that other people don't always feel or think the way they do, a critical concept in the move from egocentrism to altruism. Software which encourages children to work together as a group and not merely take turns should be selected. Turn taking is a basic social skill and for some children may be the best place to start; however, there are many ways to design computer activities which provide children with experience in cooperative problem solving. In addition to individual learning styles, children exhibit a wide variety of background experiences. These experiences greatly enrich any learning activity and encourage group cooperation.

Encourage children to learn from each other by using a "Computer Experts" chart in the computer center. Choose six or seven software programs that children can use during "free time" activity. Make one screen dump for each program and print it out on a full sheet mailing label (use the FingerPrint Card, an ImageWriter II, and a four-color ribbon for best results). To a large, laminated poster board, adhere the screen dumps in a vertical column down the left side. (Any screen dumps you don't want to use at any given time can be stuck to the back of the chart — the laminating allows you to pull them off and reuse them.) Reduce or enlarge photographs of the children on the photocopy machine onto a full sheet mailing label. Cut these out and store them on the back of the chart. When a child becomes proficient at a software program, place his picture in the row to the right of the program's screen dump on the chart. Other children who have difficulties with the program can go to that child for help.

For the teacher, becoming familiar with many different software programs adds a new responsibility, requiring time to look at, review, and design computer curriculum activities. If the district or school only has a few programs to work with, be creative. Change the way the program was intended to be used. Some software, like some library books, contains appropriate content but is poorly presented to preschool children. It is up to you to make it exciting and meaningful! Your own creativity sets the only limitations for using computers with young children.

Problem Solving Strategies and Teaching Techniques

A child with disabilities has few opportunities to take an active role in his learning. Often adults are in control of the learning situation; adults present material and the child responds to it. Using **Building ACTTive Futures** provides children the opportunity to take some control of their learning by setting up environments which encourage experimentation. Your role changes as the child becomes a more active participant in classroom activities. You become the teaching "guide." You drop clues that help children gain an understanding of their effect on the activity, on or off the computer. You do not necessarily evaluate the child's operation of the program as being right or wrong; instead, you describe what the child has done and offer clues for guiding the child in another direction. For instance, if a child is not using the appropriate keys for operating a program, instead of saying, "No, that's not right!" try saying, "You are pressing the spacebar. What would happen if you tried a different key? What are you going to try next?" Many children will be eager to find the responsive one and will try other keys. Some children will continue to press the "unresponsive" key if they get an attention gaining response from the teacher. Describing to the child what he is doing is less threatening than pointing out to him that he is doing something wrong. Be careful to monitor behaviors and praise appropriate ones. Sometimes doing nothing forces the child to take action of his own.

When you begin using this teaching technique, it takes some children a little time before they understand that answers are not going to be provided without some thought on their part. You provide the child with some possible strategies for solving problems and activities that involve logical and sequential thought. Some activities which include this content can be found in the three-five activities section and in the LOGO activities section of this curriculum guide.

When a child asks you a question, respond with a divergent question that requires the child to do some thinking. Try some of these questions to stimulate children's thinking: "How did you make this happen? How can you do that again? What did you want the computer to do instead of this? How do you think you can make it happen your way? Did you find a short cut? If you tried ... and ... and ... then you were very close. How did you know that? What would happen if you ...? Why did you ...? How could you teach Amy how to do this? Tell me about it. What did you do first ... next ... last?" Questions can go on and on.

Questions which encourage the child to predict or estimate outcomes stimulate solution to problem situations. When asked frequently, open-ended questions stimulate the child's thinking and the answers demonstrate the child's thinking. This form of teacher-child interaction encourages viewing the learning approach of each child and helps determine the next appropriate instructional concept.

One teacher relates her approach to children's questions: "I tell the children to ask a friend before they ask me. When they've asked two friends and get no answer, they can come and ask me again, and I will help." This method involves peer interaction, definite thinking, and general processing skills. By using the "Computer Experts Chart" described on previous page, children know which classmates to ask and where to go for help.

Try these hints when working with children and computers:

1. Encourage children to do as much as possible for themselves. Teach them how to insert and remove the disk. Explain to the children when the disk can be removed and when they must wait. Ask, for example, "When you are in a car and you see a red light, what should you do?" Follow up with the question, "What do you think the red light on the disk drive means?" Demonstrate proper disk handling techniques.
2. Use the computer in small groups with software programs that encourage children to work together. Children can learn valuable social skills when encouraged to group problem solve. Research has shown that spontaneous language tends to increase through computer use.
3. Encourage children to help each other. "Ask a friend before you ask me." Assign computer experts for the week. Peer teaching increases on-task behavior and facilitates the acquisition of problem-solving skills, independence, self-esteem.
4. Encourage children to discuss their questions with other children who have used the program. Answer questions with similar questions whenever possible to help children develop metacognition skills and provide a model to help children think through problems and sequence their responses.

Computer and Computer-Related Activities

The learning environment should not be confined to the boundaries of the computer center; it should extend to all areas of the classroom. This is important because many computer-related activities can be done in small groups which need a larger activity area. For example, you will probably provide many computer-related activities for LOGO before actually presenting LOGO at the computer. Activities help children develop concepts about the commands which will be used at the computer and the outcomes to expect. Children develop some skills for predicting and estimating once they understand the function of commands and when to use them.

Computer-related activities encourage the transfer and generalization of skills and concepts, complementing the knowledge gained at the computer. In turn, the computer activities can be used to reinforce concepts taught in another area of the curriculum. Integrating the computer into the preschool special education classroom will take some time. Designing computer and computer-related activities that reinforce skills will help you use the computer as an integral part of the curriculum. Further examples of learning activities are provided in the curriculum activities section. Check the "Computer-Related Activities" provided in each activity for examples.

Provide computer-related activities for children with multiple disabilities as well. Children who are candidates for alternate input or switch control benefit by learning to use a switch with battery-operated toys. Switches and toys can be sent home easily and are enjoyable. Discuss appropriate switch types with parents and a physical therapist. Once the child has an idea of how and when to use the switch, he will be able to use the switch to operate programs at the computer.

Moving from computer-related activities to computer activities does not have to be a major step since some concepts will be easier for the children to understand because of their computer-related activities. When first approaching the computer, the child should experience some fun. Programs that respond to any key press or a single switch press offer an opportunity for instant success. Challenges can be made as children show intent for what they do and understand that they are in control of what the computer is doing.

Although most classrooms have a limited amount of software, experiences at the computer do not have to be the same each time. Be creative! There are many ways that programs can be used other than is specified in the documentation. The programmer has some intentions for how a program should be used, but you can find other uses. Consider a program's use for each individual child since it is rare that a teacher can use a program in the same way with all her students. To facilitate social and communication skills, group children with similar IEP goals together as partners or in a small group for computer activities; then periodically group more experienced children with novice computer children to act as peer tutors.

Summary

Integrating the computer in the classroom can be challenging, but the results of your efforts are so rewarding. Develop your own ideas for creating the computer learning environment in the classroom as you work with the students. Consider some of the ideas presented here for developing a problem-solving approach in your classroom. Try some of the teaching techniques to organize and produce computer and computer-related activities of your own which allow children to participate actively in the learning process. Many of the activities you are now using in your classroom will probably adapt easily to the computer.

THE CHILD: SEVERE DISABILITIES

The computer can provide many positive changes in the lives of children with severe disabilities. Therefore, the importance of the computer learning environment cannot be underestimated. Experimenting and constant re-evaluating are necessary to find the appropriate placement for the computer equipment and the child, but increasing the child's ability to function independently is well worth the effort. Don't allow preconceived concepts of the child's abilities to actually limit the activities you attempt with him on the computer; the child will experience some degree of success once you have found the right combination of equipment, software, and body positioning. This section will discuss factors affecting the child's performance, helpful hints on how to store and care for equipment, equipment recommendations, and teaching strategies.

Physical Considerations

A corner of the room or an area separated from the rest of the room by dividers provides a semi-private center for computer activities. Be sure there is appropriate space for more than one child in a wheelchair to use the computer at a time or for the computer to be placed on the floor for a child to use in various positions. Placing a small table and chair in the computer center will facilitate moving the monitor and keyboard so that an ambulatory child can view the monitor just as comfortably as a child in a wheelchair. The location of outlets in the room will also play a major role in establishing where the computer is placed. Tape electrical cords against the wall or floor, when necessary, to enable wheelchairs to move freely.

Positioning Strategies

Positioning strategies for optimal computer access are extremely important for children with motor disabilities. When first determining the best position for a specific child's computer access, consult with the child's parents and an occupational or physical therapist. If the child is visually impaired, the vision consultant should be part of the team. Some positional aspects to consider are:

1. In which position is the child most comfortable?
2. What is the child's resting position?
3. How long should the child stay in one position at a time?
4. What are the child's most reliable, consistent movements? (They may vary depending on what position the child is in.)

Perception and the ability to integrate motor control with vision or hearing also play an important role in determining the most comfortable, consistent position for the child. For example, merely placing the child at a slant in relation to the monitor may improve his ability to use the input device and maintain his visual attending. Consider these questions:

1. How long can the child visually attend to the monitor?
2. Can the child visually track an item across midline?
3. Can he work with his eyes in midline?
4. How does the child coordinate his eyes and his motor skills? (Does he have to look at his hand to operate the input device? How difficult is it for him to maintain his visual attending while operating the computer?)
5. Does the child rely on his vision or his hearing to operate the computer?

Once the best position is determined for the child, the type of input device or the way the computer will be operated by the child should be addressed. Switches are available in many shapes and sizes and may be adapted for each child's individual needs.

Positioning the Computer

For ambulatory children, positioning is equally as important. Since abilities in a classroom of children with severe disabilities vary greatly, conduct a careful assessment of each individual's needs. Many children who are physically able to utilize the keyboard may find it overstimulating. For these children, alternate input devices might be considered. Some can use joysticks or touch tablets quite effectively; others might need a single switch device. Discrimination between the keys (especially programs which use keys located on opposite sides of the keyboard) may be difficult for some. Adding stickers or small overlays to the keys may be helpful, but stickers may be too distracting; the child may prefer to handle the stickers rather than use them as references. If single switch use is most appropriate, using only the monitor and the switch (without the keyboard) should reduce excessive stimulation. The location of the color monitor should be carefully evaluated — especially if the child is prone to seizures. Observe the child's seizure activity both during computer use and throughout the day to make sure seizures do not increase with computer use. Computers may not be appropriate for all of the children in the classroom.

For children who can use the keyboard, be sure the child can comfortably reach the keys. The keyboard should be a little higher than the child's elbows. If the child rests his hands on the spacebar or bottom keys on the keyboard, try raising his position in the chair or providing support for his wrists.

Once children have learned to use the computer in their "best" position, provide them with "computer time" when they are in different positions (in the prone stander, resting on the floor). Varying access positions provides opportunities for the children to control the computer environment with more freedom.

Appropriate Storage For Hardware and Software

Provide ample storage for all adaptive computer equipment and software where it is easily obtained yet out of the way. Depending on the children's disabilities and the extent to which peripherals are required, a variety of equipment may need to be stored and maintained. Commercial equipment is expensive, and all staff who use it should be trained to care for it properly. Train the entire staff on equipment storage, use, and maintenance before opening a computer center in your classroom. Store each device in a clearly labeled, covered container or closet to prevent dust from settling on it. The correct name of each piece of equipment, its function or purpose, and the names of the children who are using it should be written on a label which can be easily read. The more equipment available for use, the longer it may take to locate, connect, and change the adapted devices to meet the needs of each child who uses the computer. A peripheral cord should be coiled around a piece of cardboard with a rubber band loosely holding it together. Often, cords wrapped directly around a switch are too tight, causing the switch to remain in a constantly pressed "on" position and damaging the switching mechanism. Wipe peripheral devices with a clean damp cloth periodically to clean them and prevent them from sticking. Use keyboard covers when necessary to prevent damage to the keyboard from children who drool. When equipment is sent home with children, provide good modeling for parents by the way that you pack the equipment. In addition, conduct workshops to familiarize parents with the computer equipment so they will feel comfortable using it at home with their children.

Teaching Strategies

The applications the microcomputer holds for children with severe disabilities are flexible and powerful. Not only does it provide a medium which even the most impaired child can manipulate and control, but it also establishes an equalized interaction with others in the environment. The teacher now has a functional way to meet the needs of her students. However, computer equipment alone is not the "magic" that makes a difference for a child with multiple or severe disabilities; rather it is the way the computer is used or applied which determines its effectiveness as a classroom tool.

Software Availability

Software which enables a child with disabilities to make choices, form decisions, develop responsibility for his actions (software provides natural or logical consequences for choices made), and acquire problem-solving strategies which are transferable from one situation to another is ideal for the child who has not been able to experience this form of learning. This software does exist, but is often hard to find. **Software You Can Use in Early Childhood,** published by Project ACTT, contains an annotated listing of software which can be used creatively with young children with disabilities. Programs which help children develop general thinking skills, control over their environment, and equalized play situations are just as likely to be found in software designed for the home market as that for the education or special education market. This software may need to be customized for a child with adaptive input devices, but it does exist. Once again, remember that the effectiveness of a software program relies on the teacher's creative use of it and the supporting computer-related activities.

Group or Individual Work

One feature which makes computer use so flexible is that it may be used effectively with an individual child or with a group of children. In severe and profound classrooms, many curriculum goals are developed for individual instruction. The staff/student ratio is generally very low, which makes this type of delivery system feasible. Using software "one-on-one" (one computer, one teacher, and one child) is often necessary to insure that relevant goals are met. Individual computer sessions can confirm the appropriateness of the targeted goals, facilitate the adapting of program content to meet specialized needs, and allow for accurate documentation of child performance. In addition, the computer is infinitely patient. It does not get frustrated, provide too much assistance, or require the pressure of a personal relationship ("if I make a mistake, I will upset the teacher"), and therefore provides a non-threatening learning environment.

However, using the computer with large or small groups is a very effective way of encouraging the development of social skills. When children spend most of their days interacting primarily with adults on an individual level, they may not develop appropriate social skills. Since most of their day is adult-directed, they have few activities which they control. Learning as a result of their own actions is, therefore, less likely to occur. Competition among children, especially children with special needs, has become an area of controversy. But what about a child who has few opportunities to compete? Self-competition, challenge, and curiosity are all healthy forms of competition. Using the computer in a group can help a young child experience positive forms of competition and develop social strategies based on interaction with other children. Other experiences such as learning to work with another child to accomplish a goal (two children, each with a switch, control one computer program), support another child's efforts as on a team, and for very involved children, being aware that there are other children in the room, can all be functional goals. Opportunities for equalized play with another child are also beneficial. Imagine a child with physical restrictions being able to play an arcade game with a single switch for the first time in his life.

Children should also be given an opportunity to use the computer independently. For many children, initiating an action may be a new experience. Using the computer autonomously can help young children become risk takers. If they do not press their switch (or a key), nothing happens. No one cues them, begs them, or provides them with answers. The relationship is strictly between the computer and the child. If a mistake is made, the machine cues the child and he can correct it by himself. Observing a child using the computer alone can provide new information about him which might be useful in developing educational programming goals.

Whether using computers with an individual child or with a group, teaching strategies regarding the computer may vary from strategies used with other curricular media. Here are some helpful hints:

1. Allow the child to do as much as possible independently.
2. Use both computer and related activities to reinforce similar concepts.
3. If the child uses a switch or device other than the keyboard, encourage him to use it in other activities whenever possible.
4. Allow ample time for the child to respond before prompting. It may take some children longer to react or respond to the computer than to other instructional tools.
5. Know the software peculiarities and capabilities.The more familiar you are with it, the more creative you can become with applications.

6. Know which programs can be used independently by children and which ones require you to be present in order to reinforce the targeted goals.

With so many consultants and support staff involved in determining the best goals for each child, it is crucial that staff be well trained on how to use the computer and on how to integrate the software into the educational goals of each child. All staff who are responsible for carrying out instructional goals should be aware of possible functional computer applications for each child. In this way, the computer can be used as a flexible, functional tool which can provide a young child with a handicap equalized opportunities for interacting with his environment.

Summary

Microcomputer technology provides a new type of prosthesis for children with severe disabilities: a way to speak for nonverbal children, a way to write or draw for the physically impaired, a way to interact and control the environment for a child with multiple disabilities, a way to play with other children in an equalized manner, a way to communicate and participate in communication, a way to help a child develop ownership or responsiblity, and a way for him to participate more fully in life. Using the computer as a tool to develop the strengths of the child provides a scaffolding. Forget what a child cannot do and build from his existing skills and capabilities.

Source: Building ACTTive Futures, ACTT's Curriculum Guide for Young Children and Technology, Macomb Projects, College of Education, Western Illinois University, Macomb, IL 61455.

WHY USE A COMPUTER?

Once the decision has been made that a particular individual could use a computer, there is one more thing to be considered before the computer gets turned on. This is the step of goal setting. Is the student using the computer to increase understanding of the world by using cause and effect in more advanced ways? Is the student going to use the computer to learn traditional school subjects? Is the student going to use the computer as a tool for writing or some other form of communication? Is the student going to use the computer for recreational use, possibly with a peer? Or is the student going to use the computer as a practice and evaluation instrument to determine whether some other kind of high-tech device would be useful?

The educational team should work to set goals for computer use just as the team decides on language and self help goals. Below are some of the areas for which computer goals for a young student might be developed.

COMMUNICATION GOALS: Computers which talk or give children something to talk about can increase children's skills. Research indicates that use of a computer and speech output in speech therapy increases a child's language skills more than speech therapy which doesn't use a computer. (Laura Meyers, 1985)

PERCEPTUAL GOALS: Visual tracking, figure/ground, and visual memory are examples of skills which can be developed by a young child using a computer.

SOCIAL INTERACTION GOALS: If you can have fun alone with a computer, you can have even **more** fun with a friend. Young children who share computers demonstrate increased sharing and turn taking even when computers are turned off. (Clements, 1985)

FINE MOTOR GOALS: Computers are being used to help students develop skills such as joystick operation and concepts such as directionality. Young children can use keyboards, expanded keyboards, or Touch Windows as well as single switches to increase their hand use skills.

RECREATION GOALS: The computer may be a tool for having fun, too. Many young children with disabilities need outlets for independent play.

CREATIVITY GOALS: The computer may be a drawing tool for a student with immature motor skills. Or it may be an early writing tool when used with word processing.

COGNITIVE GOALS: These may be in areas as simple as learning to respond to a stimulus on cue or as difficult as learning to read, depending on the needs of the individual student. Any student who is able to attend to the computer's visual and auditory output could have cognitive goals for computer use. This is the area we most often think of when we think of computer assisted instruction.

Source: Oregon Technology Access Project, Oregon Department of Education, Division of Special Education. Funded by U.S. Dept. of Education, Office of Special Education and Rehab. Services, Grant #H180A80027.

STAGES OF ACTIVITY TO ACCOMPANY COMPUTER USE IN THE EARLY CHILDHOOD CURRICULUM

Precomputer Activities

- build prerequisite skills to ensure success with the selected input method and the concepts presented within computer program

Computer Activities

- highlight, enhance, and reinforce concepts presented within the computer program

Post-Computer Activities

- provide follow-up, enrichment, maintenance, and generalization of concepts presented during computer activity

All Activities should:

- utilize thematic elements and concepts presented within software

- use developmentally appropriate methods and materials — concrete and tactile objects, props and manipulatives

- should include goals encompassing language, cognitive, and social development

Adapted from: Trieschmann, M. & Lerner, J. W. (1990), Using the computer to teach children with special needs: A Guidebook of effective computer strategies, Evanston, IL: National Lekotek Center

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S-W1

COMPUTER ACTIVITIES WORKSHEET

SOFTWARE:

PERIPHERALS:

PREREQUISITE SKILLS:

SUGGESTIONS FOR PRECOMPUTER ACTIVITIES:

SUGGESTIONS FOR COMPUTER ACTIVITIES:

SUGGESTIONS FOR FOLLOW-UP ACTIVITIES:

Source: Preschool Integration Through Technology Systems, (PITTS), United Cerebral Palsy Association of Western New York, Inc., 4635 Union Rd., Buffalo, NY 14225; US DOE Grant #H024E80010

COMPUTER ACTIVITIES WORKSHEET

SOFTWARE:

FACEMAKER/Golden Edition

PERIPHERALS:

None

PREREQUISITE SKILLS:

SUGGESTIONS FOR PRECOMPUTER ACTIVITIES:

A flannel board activity using head and facial parts such as eyes, ears, hair, mouth, nose, etc., can be used. The teacher selects a flannel facial part and asks the students to name the part and/or point to their own. The students can also identify the parts and assemble faces on the board.

Other related activities: art activities, songs, motor activities, mirrors, masks, etc.

SUGGESTIONS FOR COMPUTER ACTIVITIES:

- FACEMAKER can be used with a pair of students taking turns selecting facial parts to be placed on a head. They can also take choices of extras — glasses, hats, etc.
- FACEMAKER provides the option of animating the created face. By pressing corresponding letters on the keyboard, children can make the face wink, cry, smile, etc.
- FACEMAKER also has the option of printing out the face that the students have created, along with the selected animation. This can be used as a reward or as a springboard for follow-up activities.

SUGGESTIONS FOR FOLLOW-UP ACTIVITIES:

Students can be assembled in a group for a "Grab Bag" activity. Props such as hats, earmuffs, glasses, nose and mustaches, wigs, etc. can be placed in a bag or a box. Students take turns choosing a prop and placing them on appropriate facial parts. Have the student tell what they are wearing, ex: "I have a hat on my head", or have the other students tell about their friends, ex. "Sam has glasses on his face". Other related activities: art activities, songs, motor activities, and using FACEMAKER to play a memory game or to print a face.

Source: Preschool Integration Through Technology Systems, (PITTS), United Cerebral Palsy Association of Western New York, Inc., 4635 Union Rd., Buffalo, NY 14225; US DOE Grant #H024E80010

CHECKLIST FOR SETTING GOALS

Think about the general IEP areas which you have chosen for the child. Select one area that you think you'd like to work on using the computer. Then complete the following steps using the worksheet on the next page.

_____ 1. Write the goal area.

_____ 2. Describe the child's current level of functioning in this area.

_____ 3. Write down the specific IEP goal you wish the child to achieve.

_____ 4. Review several software programs that address your goal area. Find two or three that might work for this child's particular objective. Write down the name of the program and the specific way you might use the program with the child. (i.e. Will the child work alone or in a small group? Will you need special equipment? Does the child need to be supervised?, etc.)

_____ 5. Try each program with the child. Watch the child's performance. Make notes about problems and subtasks which you may still need to teach. Choose the program which best addresses your objective.

Source: Oregon Technology Access Project, Oregon Department of Education, Division of Special Education. Funded by U.S. Dept. of Education, Office of Special Education and Rehab. Services, Grant #H180A80027.

S-H30

THE INNOTEK MODEL FOR TEACHING WITH COMPUTERS

Activity Name

Skills

Main Objectives

Precomputer Phase	**Computer Phase**	**Post-computer Phase**
Purpose	Purpose	Purpose
Materials	Materials	Materials
Activities	Activities	Activities
Evaluation	Evaluation	Evaluation

Source: Trieschmann, M. & Lerner, J. W. (1990). *Using the Computer to Teach Children with Special Needs: A guidebook of effective computer strategies.* Evanston, IL: National Lekotek Center.

LEVEL: STAFF

GOAL: **#4** Explore how application of computers and peripherals can be successfully integrated within a curriculum for young children with special needs.

COMPETENCY TYPE: VALUE/ATTITUDE

OBJECTIVE: Participants will appreciate the positive benefits experienced by young children with special needs when computer applications are fully integrated within the early childhood curriculum.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
1. Review Handout and ask participants to name the positive benefits young children derive from the computer use. Be sure the following are pointed out: - Children intrinsically seem to have FUN and ENJOY using computers. - They can participate in the same activities as their peers. - Increased language stimulations and opportunities for social interaction. - Gives children unique opportunities for independent control and accomplishment (especially apparent for those with physical limitations). - Computer has lots of patience, never tires of the same activity, is always ready to play, and never yells when a mistake is made! Secondly, ask participants to identify specific advantages for young children with special needs when computer activities (or any technological applications) are integrated within the ongoing curricular goals.	1. Handout (G-H31) *What Computers Can Do*	1. Throughout this objective, leader should emphasize how much young children *enjoy* using the computer, how it *motivates* them to complete tasks, and how children are *rewarded* by the visual/auditory feedback and the intrinsic sense of *autonomy and control* it provides. Point out that *integration of computer activities within the ongoing curriculum provides children with disabilities maximal opportunities for their own full integration within activities with their nondisabled peers.* To the degree that technology is present within their total curricular experience, children with disabilities are provided an avenue through which they can participate to highly significant degrees with their peers and profit from the ongoing curricular program. When technology is treated as an "extra" or utilized only at particular times, children with disabilities are denied the opportunity to participate with their peers and profit from the ongoing curricular program to the greatest extent possible.

S-H31

"If we focus on what they can do and work with that, then the child can find ways to work around the handicap."

Laura Meyers

WHAT COMPUTERS CAN DO

1. Give children control and independence
2. Give young children a voice
3. Provide an avenue for socialization, sharing, and teamwork
4. Help children develop cognitive skills
5. Provide immediate feedback
6. Remove emotional overlay from difficult tasks
7. Provide a tool for creativity in children with limited cognitive and motor functions.

Source: Oregon Technology Access Project, Oregon Department of Education, Division of Special Education. Funded by U.S. Dept. of Education, Office of Special Education and Rehab. Services, Grant #H180A80027

GOAL 5

Technology

LEVEL: STAFF

GOAL: **#5** Gain an overview of augmentative/alternative communication (AAC) system as a means of meeting the needs of young children with severe communication difficulties.

COMPETENCY TYPE: KNOWLEDGE

OBJECTIVE: Participants will learn and discuss specific ways AAC systems assist young children in meeting their communication needs.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
1. Large group activity Show videotape, *Let's Talk*.	1. Check with your local SERRC for a copy of *Let's Talk*. Copies are also available from ORCLISH. Transparency (S-T6) *Definition of AAC*	1. Prior to showing the video, you may want to provide a definition of AAC. Augmentative and alternative communication refers to any approach designed to support, enhance, or augment the communication of individuals who are not independent communicators in all situations. (Beukelamn, Yoder, & Dowden, 1985.) Ask participants to describe how AAC systems were shown in the video to assist children in communicating.
2. As appropriate to needs of audience, review key concepts and terminology from the Handout.	2. Handout (S-H32) *Augmentative and Alternative Communication,* Tech Use Guide Series, CEC, July 1990 Leader Notes (S-L12) *Augmentative Communication Devices*	2. Be sure to stress the broad range of systems available - low to high tech, making references to those in video. Emphasize the need for a thorough assessment of individual needs for matching needs to appropriate systems. The importance of an interdisciplinary team approach in all phases of assessment, vocabulary selection, and training for use in various environments should also be highlighted. (NOTE: Further elaboration of these concepts is made available for the leader in Leader Notes S-L12. The leader may wish to use some pages of these notes as Handouts.

ONE DEFINITION OF AAC

Augmentative and alternative communication refers to any approach designed to support, enhance, or augment the communication of individuals who are not independent communicators in all situations.

(Beukelamn, Yoder, & Dowden, 1985)

TECH USE GUIDE

USING COMPUTER TECHNOLOGY

Center for Special Education Technology

Augmentative and Alternative Communication

Augmentative and alternative communication (AAC) refers to any approach designed to support, enhance, or augment the communication of individuals who are not independent communicators in all situations (Beukelman, Yoder, & Dowden, 1985). Communication augmentation is appropriate for those who experience difficulty with the spoken and/or written forms of expressive communication. It is important to note that an individual's communication system should not be a single device or technique, but rather a collection of techniques, devices, and strategies that can be employed as the communicative situation warrants. Components of this collection include gestures, facial expression, writing, residual speech, signal systems, nonelectronic communication systems of various sizes and complexity, and electronic AAC technology.

Benefiting from AAC Approaches

AAC approaches benefit individuals with severe difficulties in speaking and/or writing. For those whose oral-motor dysfunction is so severe that speech is not intelligible, AAC approaches provide an alternate method of expression. Individuals with limited arm and hand movements can take advantage of alternate access to print capabilities. AAC approaches with spoken output can assist individuals with low vision, and AAC systems with visual display and print capabilities can assist individuals with hearing impairments. AAC approaches may also be beneficial for individuals with cognitive impairments, not only as a means of expressive communication but also as a language learning tool.

"Low Tech" Approaches

There are many AAC approaches that do not involve sophisticated technology. These approaches may be implemented in isolation, but they more often serve as components in a comprehensive AAC intervention.

Signal Systems. These systems permit an individual to call for help, attract attention, and answer simple yes/no questions. Such systems usually consist of a switch and a signal of some type. The switch is placed in proximity to a body part that the user can move easily and reliably. The signal could be a buzzer or chime, or it could be a tape-loop saying "Come here" or "I need help." Some individuals may be able to use the signal for simple coded messages (for example, one buzz means yes, two buzzes means no, three buzzes means I don't know) or for Morse code.

Communication Boards. This term refers to any display containing vocabulary choices from which the user selects a message. Low tech communication boards are those without electronic components. They can be made using a variety of materials, including wood, plexiglass, posterboard, notebooks, and paper. Communication board displays may contain objects, letters and numbers, words, phrases, photographs, or graphic representations. Brandenburg and Vanderheiden (1988) summarized the many factors that must be considered in the design of a communication board. These include:

- The physical technique the individual will use to select message components from the display.
- The types of symbols to be used on the display.
- The vocabulary items to be included.
- The arrangement of vocabulary on the display.
- The interaction strategies that the augmented communicator will use.
- The attitudes and communication styles of the augmented communicator and potential communication partners.

An individual might have a single board that contains letters and numbers and enough words and frequently occurring phrases to meet most of his communication needs. A student might use different mini-boards for different academic subjects or for different settings (playground, mall, Sunday school). Communication boards also serve as a back-up system should the user's electronic system fail.

"High Tech" Approaches

The incorporation of microprocessor technology into AAC systems has made a number of valuable features possible.

Large Vocabulary. Many AAC systems offer vocabulary capacities in excess of 2,000 entries. The challenge for the user is the management of such large vocabularies, because most systems have static displays containing a finite (and relatively small) number of items. Systems such as *Say-it-All II Plus*, *scanWRITER*, and *VOIS 160* store vocabulary at a number of levels, requiring the user to activate the appropriate level as well as the correct location on the display in order to make a message selection. Users often consult a glossary that lists available vocabulary along with the activations that are required to access each item.

Several approaches have been designed to minimize the memory demands on the user. All of the devices mentioned thus far can accommodate multiple overlays, one corresponding to each memory level. A new device, *The Talking Screen*, offers a dynamic display — the display itself changes, permitting each level to be displayed without any manual changing of overlays. *The Touchtalker with Minspeak* uses multimeaning icons to facilitate access to vocabulary items not visible on the display. The user codes his vocabulary selections with meaningful sequences of pictures, and thus doesn't need to remember a large number of letter or number codes.

Output Displays. Many devices contain LED or LCD areas for display of messages. As the user makes a selection, the words appear in the display. This permits the user to review the message, and serves as a medium for the communication exchange between partners. Many systems also generate hard copy (print on paper), a useful feature when a permanent record of communication is desired.

Speech Output. One of the most significant advances in AAC has been the availability of spoken output. Speech output renders technology accessible to those who cannot read and those with visual impairments. It also makes communication possible in the traditional auditory modality. Some devices, like the *Mini Talking Card Reader*, record short segments of a speaker's voice onto magnetic tape. Devices like the *Wolf* and *Touchtalker* produce synthesized speech, which is created by subjecting text to a set of pronunciation rules.

The appeal of synthesized speech is its flexibility. Any utterance that can be entered as a text string can be produced, resulting in the potential for unlimited vocabulary. The sophistication of speech synthesizers varies, as does the quality of the speech they produce. Generally, research has demonstrated that *Echo, Votrax,* and *Smoothtalker* speech are significantly less intelligible than *DECtalk* speech (Mirenda & Beukelman, 1987).

An alternative to synthesized speech is digitized speech. In this approach, the speech is digitally recorded, modified for storage in the system, and then reconstructed as spoken output. Although this process yields much more natural-sounding speech, it is very memory-intensive. It is also less flexible than synthesized speech because only prerecorded output can be used. Among the AAC systems offering digitized speech capabilities are the *Introtalker, ALLTALK*, and *Parrot.*

Input Modes. Advances in input technology facilitate access to AAC systems for individuals with the most severe motoric limitations: almost any physical movement now can be harnessed to control communication systems. For example, the *P-Switch* can be activated by almost any muscle movement and can be used to control scanning communications systems. *Voicescribe-1000,* a voice input system with a potential 1,000-word vocabulary, can be used by individuals with consistent vocal output who need to access written communication options. *Freewheel* is a cordless device that allows head-pointing and other body motions to be used to access standard software on a personal computer.

Rate Enhancement Techniques. Several AAC systems incorporate features that improve the efficiency of communication for the user. Prediction routines, such as those found in the *Portable Anticipatory Communication Aid* (PACA) and *Equalizer,* learn the word usage frequencies of the user. When the user begins entering a word, the system responds with the most frequently used words beginning with that letter sequence. Abbreviation routines, as found in the *RealVoice*, allow the user to access items in memory using abbreviation. For instance, the system might be programmed to produce "See you later" with the single keystrokes "C-U."

Customizability. Each individual has unique communication needs, and it is important to be able to customize a system to meet those needs. Many systems come with a standard vocabulary, but allow the user or caregiver to program in additional vocabulary as needed. Similarly, most systems offer the consumer the option of customizing overlays to make them appropriate to the user's cognitive and linguistic abilities.

Assessment and Intervention

Every user presents a unique constellation of needs and abilities, and the range of available AAC systems expands yearly. The process of matching user needs to appropriate interventions should involve thorough evaluation and careful consideration of options.

Potential consumers of AAC interventions may demonstrate deficiencies in motor abilities, cognitive abilities, language skills, social/emotional development, and performance of activities of daily living. All of these areas should be evaluated, because AAC intervention will be affected by them and will in turn exert some influence on them. The need for such a comprehensive approach requires that input be derived from a multitude of sources. A team approach is essential, with expertise being shared among parents, potential AAC consumers, teachers, aides, speech/language pathologist, occupational therapists, physical therapists, medical personnel, ophthamologists, audiologists, educational diagnosticians, psychologists, social workers, rehabilitation engineers, and others with pertinent input. Several protocols have been developed to guide the assessment process (see Beukelman, Yorkston, & Dowden, 1985 and Blackstone, Cassatt-James, & Bruskin, 1988).

It should be emphasized that AAC assessment and intervention are not discrete events, but rather components of the process of assisting an individual to reach his or her highest potential. Contrary to popular belief, the process is not completed when a consumer acquires an AAC system. Understanding of AAC has matured in the past decade, and most people now realize that successful communication abilities do not emerge automatically as a function of device acquisition. Communication skills must be taught, with the goal being the achievement of **communicative competence**. Light (1989) defines a competent communicator as one whose communication is functional, adequate, and skilled in regard to the linguistic, operational, social, and strategic aspects of communication. A competent communicator is one whose communication can meet the demands of daily life. The communication does not have to be perfect, because no one is a perfect communicator. Rather, the user should demonstrate an adequate grasp of vocabulary and grammar, adequate operation of the AAC systems, appropriate interaction skills, and the ability to employ compensatory strategies to enhance communicative effectiveness.

Attention should be directed toward all of these abilities during training. Furthermore, training should be provided not only for the augmented communicator, but for the communication partners as well. Caregiver training could almost be considered a prerequisite for success. Without interested, encouraging, skillful partners, many of the augmented communicator's opportunities for learning and practice would be lost. Given the importance of early success to later motivation and effort, it is essential that training be directed at both sides of the communication dyad.

Crucial Intervention Issues

Training Interaction Strategies. So often people with severe expressive communication problems learn to assume a passive role in communication interactions. They get lots of practice responding, but little experience initiating. Thus, AAC intervention must include explicit instruction in interaction behaviors and strategies. AAC consumers must learn that there is no single correct way to interact with all communication partners: The interaction strategies employed should be selected on the basis of the communication task, the setting, and the skills and attitudes of the partner. Consumers must learn how to get attention, introduce topics, negotiate meaning, interrupt, convey emotion, take turns, and resolve communication breakdowns. They need to learn to work with their communication partners to maximize the successful transfer of information. Kraat (1987) provides an excellent overview of this topic.

Promoting Language and Literacy Skills. The lack of language and literacy skills limits an individual's AAC options. Systems based on spelling, or those requiring knowledge of morphological and syntactic conventions, are inaccessible to individuals without sufficient language and literacy skills. Difficulties with these skills often hold students back from academic achievement and prevent adults from performing adequately at the job site. This topic has just recently begun to be addressed in the literature. Blau (1988) suggested a four-phase approach to developing literacy in young children that emphasizes a positive reading experience, development of a sight work vocabulary, an introduction to phonics, and the development of sentence comprehension. Very young children who have had access to a symbol-based communication system may have an inherent understanding of symbolic representation, lessening the difficulty of the transition to the written word.

Children who are nonspeaking do not have the opportunity to practice sound/letter correspondence orally, so interventionists must emphasize these relationships in other ways. Access to an AAC system may provide an individual with his first opportunities to experiment with sound combinations (if the system has voice output) and language manipulation. Cohen (1988) suggests ways in which word processing software developed for the regular education market can facilitate the development of literacy skills.

Vocabulary Selection. An AAC consumer's communicative effectiveness and efficiency can be enhanced if the system provides access to the appropriate vocabulary. There are many techniques that one can use in making vocabulary determinations. In all cases, it is crucial to approach this task in terms of what the consumer wants and needs. Yorkston and her colleagues (1989) described several methods to employ when selecting vocabulary:

Environmental inventories — This approach to vocabulary selection involves a survey of each of the environments in which the AAC consumer interacts to determine the people and objects present and the activities that are likely to occur. From these observations, lists of potential vocabulary items can be generated.

Communication diaries — AAC system vocabulary should be updated frequently to reflect changes in the user's lifestyle and communicative interactions. To facilitate this updating, the consumer can compile a history of communications either by printing and saving all output (if the system has this capability) or by having someone record the communications for a period of time. Analysis of this record will reveal those items used frequently that are not available in the vocabulary.

Vocabulary list review — Another excellent technique is the review of vocabulary lists. It is difficult to generate vocabulary items spontaneously, but much easier to recognize appropriate words on a list. A review of standard lists is also helpful in identifying the structural words essential for grammatically correct utterances. Often these words are overlooked because the focus is on listing words that will expand the content of a user's communication.

Blau (1986) offers some guidelines for evaluating the utility of selected vocabulary. Among her criteria are:

- Can the item be used to code a variety of communicative functions?
- What is the potential for recombination of the item?
- How frequently is the item used, and in what settings?
- How much information is conveyed by the item?
- How high in reinforcement value is the item for the consumer?
- Does the item have potential for peer interaction and play?
- How much interest does the item hold for the consumer?

In determination of vocabulary, as in all aspects of assessment and intervention, the consumer should be involved in the process to the greatest extent possible.

Resources — Organizations

American Speech-Language-Hearing Association. 10801 Rockville Pike, Rockville, MD 20852, 301/897-5700.

Applied Science and Engineering Laboratories. University of Delaware/A. I. duPont Institute, 1600 Rockland Road, Wilmington, DE 19899, 302/651-6830.

RESNA. 1101 Connecticut Avenue NW, Suite 700, Washington, DC 20036, 202/857-1199.

Trace Research and Development Center. S-151 Waisman Center, University of Wisconsin-Madison, 1500 Highland Avenue, Madison, WI 53705, 608/262-6966.

United States Society for Augmentative and Alternative Communication. Judy Montgomery, President, Fountain Valley School District, 17210 Oak Street, Fountain Valley, CA 92708, 714/857-1478.

Resources — Journals/Newsletters

Augmentative and Alternative Communication (journal). Williams & Wilkins, Publisher, 428 E. Preston Street, Baltimore, MD 21202-3933.

Augmentative Communication News (newsletter). Sunset Enterprises, One Surf Way, Suite 215, Monterey, CA 93940, 408/649-3050.

Communication Outlook (newsletter). Artificial Language Laboratory, Michigan State University, 405 Computer Center, East Lansing, MI 48824-1042, 517/353-0870.

Closing the Gap (newspaper). Rt. 2, Box 68, Henderson, MN 56044, 612/248-3294.

Availability Information

Trace Resourcebook: Assistive Technologies for Communication, Control, & Computer Access. Available from the Trace Center, address above.

Wallchart on Commercially-Available Communication Aids. Available from Applied Science and Engineering Laboratories, address above.

Assistive Technology Sourcebook. Available from RESNA, address above.

ABLEDATA (product database). Available from Adaptive Equipment Center, Newington Children's Hospital, 181 East Cedar Street, Newington, CT 06222, 800/344-5405.

Products Mentioned in Text

ALLTALK, FreeWheel, RealVoice. Adaptive Communication Systems, Inc., 354 Hookstown Grade Road, Clinton, PA 15026, 412/264-2288.

Mini Talking Card Reader. Crestwood Company, P.O. Box 04606, Milwaukee, WI 53205, 414/461-9876.

Voicescribe-1000. Dragon Systems, Inc., 55 Chapel Street, Newton, MA 02158, 617/965-5200.

Say-It-All II Plus. Innocomp, 33195 Wagon Wheel, Solon, OH 4439, 216/248-6206.

VOIS 160. Phonic Ear Inc., 250 Camino Alto, Mill Valley, CA 94941, 415/383-4000.

Introtalker, Touchtalker, P-Switch. Prentke Romich Company, 1022 Heyl Road, Wooster, OH 44691, 216/262-1984.

Equalizer, Talking Screen. Words +, Inc., P.O. Box 1229, Lancaster, CA 93535, 805/949-8331.

Parrot, scanWRITER, PACA. Zygo Industries, Inc., P.O. Box 1008, Portland, OR 97207, 503/684-6006.

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Readings

Beukelman, D. R. & Yorkston, K. M. (1989). Augmentative and alternative communication application for persons with severe acquired communication disorders: An introduction. *Augmentative and Alternative Communication*, 5, 3-13.

Beukelman, D. R. Yorkston, K. M., & Dowden, P. A. (1985). *Communication augmentation: A casebook of clinical management.* San Diego: College-Hill Press.

Blackstone, S. W. (Ed.). (1986). Augmentative communication: An introduction. Rockville, MD: American Speech-Language-Hearing Association.

Blackstone, S. W., Cassatt-James, E. L., & Bruskin, D. M. (Eds.). (1988). *Augmentative communication: Implementation strategies,* Rockville, MD: American Speech-Language-Hearing Association.

Blau, A. F. (1986). Vocabulary selection in augmentative communication: Where do we begin? In H. Winit (Eds.). *Treating language disorders: For clinicians by clinicians* (pp. 205-234). Baltimore: University Park Press.

Blau, A. F. (1988). Fostering literacy development. In S. W. Blackstone, E. L. Cassatt-James, & D. M. Bruskin (Eds.). *Augmentative communication: Implementation strategies* (pp. 5.6/1-9). Rockville, MD: American Speech-Language-Hearing Association.

Brandenburg, S. & Vanderheiden, G. C. (1988). Communication board design and vocabulary selection. *The vocally impaired: Clinical practice and research* (pp. 84-133). New York: Grune and Stratton.

Cohen, C. G. (1988). Developing writing skills in the classroom through the use of word processing. In S. W. Blackstone, E. L. Cassatt-James, & D. M. Bruskin (Eds.), *Augmentative communication: Implementation strategies* (pp. 5.6/18-21). Rockville, MD: American Speech-Language-Hearing Association.

Kraat, A. W. (1987). *Communication interaction between aid users and natural speakers: An IPCAS study report.* Madison, WI: Trace Research and Development Center.

Light, J. (1989). Toward a definition of communicative competence for individuals using augmentative and alternative communication systems. *Augmentative and Alternative Communication*, 5, 137-144.

Mirenda, P. & Beukelman, D. R. (1987). A comparison of speech synthesis intelligibility with listeners from three age groups. *Augmentative and Alternative Communication*, 3, 120-128.

Mirenda, P. & Mathy-Laikko, P. (1989). Augmentative and alternative communication applications for persons with severe congenital communication disorders: An introduction. *Augmentative and Alternative Communication*, 5, 3-13.

Yorkston, K. M., Honsinger, M. J., Dowden, P. A., & Marriner, N. (1989). Vocabulary selection: A case report. *Augmentative and Alternative Communication*, 5, 101-108.

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- Hearing Impairments
- Computers and Writing
- Computers and Cooperative Learning
- Visual Impairments
- Learning Disabled
- Telecommunication Networks
- Augmentative and Alternative Communication
- Mildly Handicapped

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WHAT IS AUGMENTATIVE AND ALTERNATIVE COMMUNICATION?

The term "augmentative and alternative communication" sounds like a mouthful of words. Professionals in work settings that serve individuals with developmental, physical, or medical disabilities instead often use the term "AAC" to refer to this relatively new way of helping people with certain communication disabilities. AAC involves the use of communication techniques to supplement or to augment one's physical ability to use oral or written communication.

A simple communication board consists of some pictures glued to a piece of poster board; the board is covered by clear contact paper. Several miniboards contain specific vocabulary for a variety of situations. The communication board does not "speak"; someone else is needed to read aloud the message the student wants to send. Some communication devices are electronic and may speak the words or phrase, print out the message on tape or have it appear on an LED (Light Emitting Diode) display.

Other AAC users, because of more extensive physical disabilities, may need to indicate a word choice by activating a switch which is connected to an electronic communication device. Regardless of the degree of disability, most people are capable of operating a switch by either using direct pressure on the switch or by using a minimal motion such as a facial movement to activate it. For example, if a person can spell, only eye movement may be needed to type out messages on a communication aid.

Some people are AAC users but they do not use a physical aid for communication purposes. Instead, they may use their hands for communicating by manual sign language or some other gesture system. Others, particularly those with severe cognitive impairment, may use body movements, such as reaching or pushing something away, as a means of communicating some messages.

Many AAC users will use a variety of ways to communicate. What works best is a highly individualized matter for each person. Some people can't read and need to use pictures; others lack the hand skills to use any sign language. An electronic device may be appropriate for some individuals while others are more effective with a nonelectronic device. AAC options are numerous because the abilities and needs of the various users are very diverse.

An excerpt from *Augmentative/Alternative Communication in Indiana* by Beverly Vicker and Diane Williams, Indiana University, Bloomington, IN.

WHO CAN BENEFIT FROM AUGMENTATIVE ALTERNATIVE COMMUNICATION?

Augmentative aids and techniques are appropriate for individuals with varying degrees of physical or cognitive involvement that interfere with effective vocal communication. They are appropriate for individuals of all ages. Augmentative aids can also be used with individuals who can speak, but are unable to write because of sensory or motor impairment. Populations that may benefit include persons with:

A. **Neurological Diseases:**
Amyotrophic Lateral Sclerosis (Lou Gehrig's Disease); Multiple Sclerosis; Muscular Dystrophy; Parkinson's Disease; Huntington's Chorea

B. **Acquired Conditions:**
Head injuries from car, motorcycle, snowmobile accidents; strokes; spinal cord injuries; laryngectomy; glossectomy

C. **Congenital Conditions:**
Cerebral palsy; mental retardation; developmental speech/language disorders; genetic syndromes

D. **Temporary Conditions:**
Guillain-Barre syndrome; Reye's syndrome; post-surgery/trauma (intubation, tracheotomy, respirator)

WHY USE AUGMENTATIVE ALTERNATIVE COMMUNICATION?

Everybody has something to say. Communication is a basic right and necessity. Personal and academic achievement is closely related to the ability to communicate.

An excerpt from *Augmentative Communication: An Introduction* by Sarah W. Blackstone; published by ASHA.

GENERAL INFORMATION AND RESOURCES FOR OBTAINING AUGMENTATIVE COMMUNICATION AIDS

Before seeking funding for a communication device, many preliminary activities take place. A complete, multidisciplinary assessment is recommended by professionals who have been trained in the area of augmentative communication and technology. This team could include but would not be limited to a speech/language pathologist, occupational therapist, educator, psychologist, nurse, vocational counselor, etc. Parents or caregivers should also be included in this team to supply information and evaluate various systems. "Low Tech" or non-electronic options should be considered as well as electronic devices. The intent to communicate must be clearly identified through the assessment process. Seating and positioning must be addressed to insure that the individual is using the most efficient system of accessing the device or system.

Use of several communication systems and/or devices on a trial basis in all settings is highly recommended after the assessment. An inventory of initial vocabulary and phrases from the assessment and observations of the individual in various settings can be individually arranged or programmed on the system/device for the trial period by the speech/language pathologist or other trained professional with team input and involvement.

The team should reconvene to evaluate the effectiveness and appropriateness of each system/device and the access mode. The team should make sure that all appropriate systems/devices are considered or tried by the individual before making a final recommendation. Consideration should be made in regards to future needs and uses. A less costly device may not always allow for flexibility and growth. Since individuals and technology change frequently, upgrading systems will need to be considered periodically depending upon needs.

Assistance with resources to evaluate and assess nonspeaking/nonwriting individuals can be obtained by contacting the educational agency where a child, birth through 22, resides or public centers for medical or vocational rehabilitation, speech/language pathology, etc. The references listed on the following pages of this booklet may be consulted.

Steps to Funding, (May 1991). Ohio Augmentative Communication Problem Solving Consortium.

AUGMENTATIVE COMMUNICATION DEVICES

Carol Suddath and Jackie Susnik
A Product of the Center for Special Education Technology
Operated by The Council for Exceptional Children
Funded by Office of Special Education Programs
U.S. Department of Education

INTRODUCTION

Communication is the sharing of one's needs, feelings, experiences, and ideas through different channels or modes. These modes of communication may be verbal (spoken, through verbal speech or speech output communication aids) or nonverbal (facial expressions, body language and orientation, gestures, and tones). Approximately 35% of what we communicate is verbal and 65% nonverbal. For example, "Honey, come here" may take on different shades of meaning, depending on the accompanying tone, body language, and facial expression of the speaker. Communication may also take a variety of forms, including spoken, written, and artistic (music and art forms).

To interact with others, we must have some understanding of what communication is and what the verbal and nonverbal messages of others mean. Our receptive language involves our ability to "make sense" of the words used by others, so that there is a common frame of reference. For example, when the word "chair" is spoken, both listener and speaker envision a similar picture or referent. Thus, an individual must have sufficient receptive language to be able to produce a message that will be understood. In cases where the overall receptive language is depressed, you should expect that use of communication technologies will be directly related to language competence. In other instances, there may be specific receptive gaps or an inability to transform receptive language into expressive communication, which will restrict or limit the ability to produce all expressive components.

Augmentative/alternative communication (AAC) can help people with both productive and receptive communication disabilities to interact with the world. AAC refers to any technique used to enhance or augment communication. For many years, people have designed and used AAC systems and strategies to communicate with nonspeaking individuals. Some of the methods used have included multiple choice questions, eye blinks, gestures, sign language, communication boards, communication books, alphabet boards, and even primitive Morse Code systems. Recent years have seen the addition of computers and environmental control systems. Most of these systems are still effective and are a part of AAC technology today. One of the most liberating pieces of technology is the voice output communication aid (VOCA).

VOCAs are stand-alone, dedicated electronic devices that produce computer-generated speech. Many VOCAs are available, each with its own distinct features and characteristics to serve the diverse needs of students with communication disabilities. Please bear in mind that, as important as the VOCA may be, it is still only part of the student's communication system. The "big picture" requires that we promote the use of all appropriate communication strategies, both verbal and nonverbal.

We've written this booklet to introduce you to VOCAs. Whether you are a primary user, parent, teacher, or speech therapist, it is designed to give you a "nuts and bolts" description of how, when, and what to expect when using a VOCA in the classroom.

Two things are critical for you to remember as you begin this new endeavor: (1) You already possess a wealth of information and skills in your field; and (2) To effectively implement technology, remember that it is a means to an end, not the end itself. More than once, it has surprised us to find out that competent service providers lose sight of this.

A brief illustration may clarify what we are trying to say. A speech/language therapist was being trained on the programming of a Speech Pac voice output communication aid. During the process, she asked, "Now that the system is operational, what should I work on with this student?" Our reply was simply to ask where she placed his language skills and what would she work on with any student who was at that level. She realized that she had the training to deal effectively with this student, and that she, herself, was quite capable of developing appropriate objectives.

This story is not meant to disregard strategies that are unique to effectively using an augmentative communication system. It is, however, meant to reassure our readers that they have the prerequisites to assist students in developing their communicative potential.

VOCA-related terminology, general training techniques, common problems, and helpful hints are described to help you settle into this unfamiliar territory comfortably. Part 1 of this booklet discusses the essential "people" factors in VOCA use — the educational team and the student. Part 2 provides guidelines for accommodating VOCA users in the classroom and using the device for enhancing their learning. Part 3 explores how students can benefit from VOCA as they go out into the community. Part 4 provides precautions, helpful hints, and a troubleshooting checklist. The appendixes include a glossary, devices and vendors list, resources, and references.

We hope that this booklet will get you started and inspire you to delve further into the opportunities afforded by VOCA technology.

PART 1
THE EDUCATIONAL TEAM AND THE STUDENT

What is the Educational Team?

When a nonspeaking person enters an educational or hospital setting, he or she is evaluated to determine what AAC systems or training options might be appropriate. Individuals involved in this evaluation process might include a speech pathologist, physical therapist or occupational therapist (support staff), medical doctor or nurse, psychologist, engineer, computer technology specialist, teacher, social worker, vocational counselor, parent/direct care giver, and the student. It is important that parents and direct care staff be involved throughout this evaluation process, as well as in the training that follows. This evaluation differs across states and facilities, but the outcome includes recommendations that match the student to the training process and AAC system that best meets his or her individual personality and needs.

If possible, the student should have the opportunity to use the recommended system(s) on a trial basis, before a specific VOCA is purchased. The evaluation process, along with its documentation, is extremely important because there is no single device that is appropriate for all nonspeaking individuals. Attempts should be made to obtain a copy of this evaluation and therapy progress reports, to provide a complete picture of the student's needs and functioning level. Direct contact with members of the evaluation team, educational team, or previous support staff is also recommended. This is particularly important if you experience frustration with use of the VOCA. Although the educational team attempts to make an ideal match between user and device, for a variety of reasons, optimal decisions do not always result. Communication among evaluation team, practitioners, and users facilitates ongoing evaluation and feedback. Thus, if vocabulary revisions are required or if a different device would be deemed more suitable, a decision encompassing all three perspectives can be made.

What Do You Need to Know About the Student?

It has been said that you cannot select a VOCA for anyone until you know that person as an individual — his or her capabilities, limitations, needs, interests, hopes, and aspirations. This axiom makes sense because a VOCA is indeed an extension of the individual's personality.

You need to evaluate the student's abilities, including motor, perceptual, cognitive, social, and communication competence. You need to consider the student's physical and social environments because they are an intrinsic part of communication effectiveness. Educational and vocational goals also need to be addressed in VOCA selection.

As every experienced teacher knows, three issues are crucial to success in acquiring and using a new skill.

- The student must have appropriate opportunities to use the skill. You have to look at the student's daily schedule and determine when and where such opportunities are likely to occur. For example, if you want to encourage dialogue, you need to be aware of relaxed, uninterrupted time segments when conversation might naturally take place.
- You need to know what motivates the student. In some cases it may simply be pleasing the teacher; or it may be that the child wants to be the center of attention; or it may be a tangible reward. In the optimal scenario, the simple act of communicating will be reward enough.

- Take advantage of the student's sense of humor. It's a prime motivator for spontaneous communication and social interaction.

Obviously, you will want to evaluate these areas in some detail. There are numerous assessment tools and checklists available. For example, the INCH assessment tool (see Appendix B) offers some helpful guidelines. (Also, see Appendix C for resources and references.)

PART 2
USING THE VOCA IN THE CLASSROOM

How Do I Introduce VOCA Use to My Class?

The addition of a VOCA user to your classroom will probably result in some unanticipated situations. We would like to suggest the following activities that will facilitate the integration process: (a) an introduction of VOCAs and VOCA users by an informed user; (b) classroom rules, which describe and define how the VOCA will be used and who will be allowed access to it; and (c) determination of places where the VOCA will or will not be used.

The presence of a VOCA in your school will create a great deal of curiosity and interest, and we suggest that you make this a learning experience for all. We recommend that you use a former teacher or parent as a resource because they have already experienced some of the concerns that you will have. You might also enlist other people in your community — perhaps a special education teacher, a speech therapist, or a university professor who has worked with VOCAs — to do a presentation at your school. Suggest that they discuss what VOCAs are, how they work, explain how a student acquires a VOCA, and give examples of how the device sounds. You might contact the vendor to ask is there is a videotape available. Being able to see a VOCA user "in action" often helps to demystify this process. You might also suggest that staff (and students) spend a period of time (30-60 minutes) as a nonspeaking individual, to bring about sensitivity to the impact of this disability.

How Will the VOCA Affect the Classroom?

Having a VOCA user in the classroom will result in many changes, including attitudes, structure, and space. Every VOCA user (just as every one of us) is a unique individual, with varying needs. The VOCA user may require special seating arrangements or methods to secure and access the device. Again, if you're not sure how to deal with wheelchairs or hardware arrangements, go to resources in your school, community, or to vendors and ask questions.

Rather than raising a hand to indicate that he or she wants to participate, the user might activate a buzzer or give eye contact to gain the attention of others. As you get to know the VOCA user, his or her methods may become evident; or you could provide options and jointly determine which will work out best within the school setting. Don't forget to use former teachers and parents as resources.

Every VOCA has different features, some of which may expand classroom performance. Some examples include: the *Light Talker's* ability to act as an alternate keyboard for a computer; the *WOLF's* ability to activate battery-operated toys in conjunction with speech production; the *SpeechPAC's* ability to act as an environmental control interface. Some VOCAs have features that can be adapted for other classroom applications.

Should Other Students Be Allowed to Touch the VOCA?

After your initial introduction, you may continue to have concerns regarding who should be responsible for the VOCA, or have access to it. Often, other student may attempt to help the VOCA user, resulting in several potential problems. First, the user should be consulted and should indicate whether or not he or she would like assistance. Sometimes, in our effort to "help," we may fail to realize that students with disabilities want or need to do things on their own, being as independent as possible in all situations. It's fun to operate a power chair or VOCA, but your other students may need to be reminded that these are tools that belong to and help the student with disabilities participate in classroom activities. On the other hand, nonusers may be engaged to prompt or model communication strategies with the VOCA. This may be an excellent training technique, and may serve to reduce frustration when the VOCA user is confused or exposed to new tasks. It may also help other students learn language, communication, and social concepts.

How Should the VOCA Be Integrated Into the Academic Curricula?

It is impossible to detail training strategies in this booklet, but several sources of sample strategies are available through national and local organizations, such as the American Speech and Hearing Association (ASHA) and the United States Society for Augmentative and Alternative Communication (USSAAC), which present training and curricula (see Appendix C). We suggest that you contact these organizations, explain your needs, and ask if they can provide assistance. What we can offer here is some broad-based suggestions for most classroom VOCA users. It is amazing to contemplate the cognitive processes and skills one can facilitate with a VOCA, such as the following:

- Awareness of cause and effect — simply the push of a switch produces something.
- Comprehending a means to an end and therefore learning to initiate requests. By programming a word for something that the student has demonstrated he or she consistently enjoys, and placing the VOCA in a strategic location for the student to activate, the student can learn that the VOCA is a means to an end; that is, the student activates the sound and gets the desired object.
- Indicating preferences. By programming simple choices of leisure activities or locations in the room, the teacher can encourage the student to self-determine some preferences.
- Participating in songs or nursery rhymes — learning to anticipate "events" that occur in "predictable" rhymes or stories.
- Creative, exploratory play. Children can role-play adult activities, such as talking to dolls or going to the store.
- Conveying messages. Students learn concretely communicative responsibility.
- Participating in "circle" routine activities. Rote skills such as calendar words can be elicited, class jobs chosen, and weather referred to and indicated. The visual reinforcement on overlays, as well as the auditory feedback, assists in the initial learning and retention of these concepts.
- Acquiring and displaying social rituals (courtesies), such as saying "please," "thank you," "hi," "good-bye," and "What's your name?"
- Memorizing series, such as days of the week.
- Organizing information, such as how prepositions and concept words relate to each other by seeing their graphic representation.
- Acquiring sight word recognition.
- Using the device as a "dictionary" reference when spelling.

- Developing a sense of phonics for reading and spelling. Many VOCAs have the ability to phonetically produce sounds from the English language; such a programmed level can be used during spelling, writing, and reading.
- Participating in class performances and skits.

As is apparent from this list, you should approach the VOCA user as you would any other learner in your classroom, except that this student has a machine that facilitates fuller participation. Your focus should not be centered around teaching the student how to use the VOCA, but rather using the device as a learning tool.

We encourage teachers to learn to program VOCAs, enlisting support from previous teachers or therapists, community resources, parents, or direct care givers. Initially, programming a VOCA may be a very intense task, but stay calm and stick with it. As with any other new skill, it simply takes practice and review of the VOCA manuals provided by the manufacturer.

How Does the VOCA Encourage Socialization?

In addition to learning social rituals with the VOCA, students also engage in conversation and humor. It is our experience that these are often learned beyond our expectations — a sort of experiential, incidental learning occurs. It is helpful to program in humorous quips and even jokes or riddles to expedite the process, but the most fun often comes from student "self-communication" strategies. One student, for example, tried flattery to get the teacher to cut a lesson short: he said (with the VOCA), "You are pretty." At the other end of the spectrum, of course, was the boy who put his phonics lessons to quick use by producing letter-by-letter expletives on the bus for the entertainment of all his peers. Another boy, asked to spell the word "fish," tired of demonstrating his spelling prowess, summarily turned to the food page, activated the cell with the food item "fish" on it, grinned, and quickly shut down his machine. One student established his assertiveness during a classroom discussion of the calendar and upcoming events by interjecting, "My birthday is May 3." This was an individual who was not about to be overlooked or forgotten in the "regular" routine of things. All of these instances certainly helped students express their unique personalities.

PART 3
USING THE VOCA IN THE COMMUNITY

A current trend in providing services to people with multiple disabilities is community-based training. Through this approach, these students learn to use their local community services, such as libraries, fast food and other restaurants, grocery stores, and banks. The students also participate in employment opportunities.

As mentioned previously, a VOCA is only one component of the student's entire communication system. When doing community-based training, teachers should be concerned with all aspects of the student's communication, including the following:

- Using language appropriately in social contexts *(pragmatics)*; for example, having the student approach a store clerk and being close enough to be heard before making a selection.
- Being aware of timing in communication *(Chronemics)*; for example, responding promptly in a turn-taking situation.
- Making choices; for example, selecting items from a food menu.

Some community-related skills can be practiced in the classroom, such as the following:

- Personal identification.
- Manipulating money and numbers.
- Transporting and manipulating the VOCA and overlays.
- Efficiently using community-based vocabulary (e.g., names of the burgers at a fast food restaurant, sizes of different food items, and survival words such as "push," "in," and "restrooms").
- Turn-taking — both conversational and physical (e.g., waiting in line at a drinking fountain).

Most skills, however, are best trained in real-life situations where the student experiences all of the steps in the activity. Not only is the isolated skill learned (producing a fast food order), but the student learns the entire activity, including those events that precede and follow this skill which facilitates skill acquisition and generalization. In addition, community-based training reveals other skill areas that need to be addressed, as indicated by the following scenario.

An ambulatory VOCA user was taken to a fast food restaurant. After placing and receiving his food order, he took the food to his seat and left his VOCA on the restaurant counter. This was discussed by the educational team, with the following solution. During subsequent trips to fast food restaurants, the student was prompted to put his food tray on top of his VOCA (which was in a case), carrying both at the same time. This "trial" ended up working well, and there have been no further problems.

Another student had to learn to grasp her food tray with one hand, while carrying her VOCA (by a handle) with the other. A shoulder strap would also be an option for some students. A student in a wheelchair might have to use the VOCA to ask that the food order be placed on his or her lap tray.

As with academic studies, numerous community-based programs and training suggestions are available through national and local agencies. Just ask!

Before conducting community-based training, you should engrave the VOCA with the student's name and social security number and attach a luggage tag that provides a phone number in case it is lost. Satchels and bookbags serve as good cases for VOCAs. The devices do get lost, broken, misplaced, and stolen; and batteries go dead at the most inopportune times. If such mishaps occur, rest assured, it has probably happened to someone else, too.

There may be some environments, such as amusement parks, that are hostile to VOCA use. You should confer with the VOCA user and professionals on the advisability of taking the VOCA to such environments. You may want to make other provisions, such as using activity-specific communication boards or just the overlays of the VOCA. Before such outings, do an environmental inventory (check out the territory) and plan well in advance.

PART 4
PRECAUTIONS AND TROUBLESHOOTING

Helpful Hints and Precautions

Read the Manual

Even if it seems like Greek — try. Familiarity and time will comfort you. Documentation has become more readable because people took the time to read the manuals, and then voiced their frustrations to the vendors and manufacturers. Now manuals usually provide a "guided tour," which walks you through the use of the device. One valuable section is the "troubleshooting" section. This section generally makes no assumptions; it will remind you to do basic things (like check to see if the battery is charged) before you get panicky or before you call the manufacturer. In addition, this section gives you guidelines on how to organize and explain the problems to technicians. Many manufacturers also include teaching strategies that have proved very helpful to some trainers.

Know the Resident Vocabulary

Become familiar with the vocabulary residing on the device. You may not be in charge of determining the original vocabulary, but the user or the parent will know what vocabulary is really used or needed. Your familiarity with the vocabulary and where it is located will allow you to facilitate the student's access; therefore, communication will flow more smoothly.

Gather Information

Solicit information from significant others (family, former teachers, and friends) and from vendors and other people using similar technology. This will help you avoid many pitfalls, develop realistic expectations, provide for transitional use, and increase trust and acceptance levels. Also, share your gained knowledge with others. Teaching is a great way to clarify your thoughts and internalize information. We encourage you to make connections with the following national organizations: Center for Special Education Technology (800/873-8255), American Speech, Language, and Hearing Association (800/638-6868), United States Society of Augmentative and Alternative Communication (c/o ACS) (800/247-3433), and Alliance for Technology Access (415/232-0621).

Find an Expert

Seek out a competent VOCA user to give classroom demonstrations, particularly in the context of a lesson. This is a consistent recommendation of teachers, vendors, and others consulted in the preparation of this booklet.

Have Reasonable Expectations

If students are not allowed to talk out in class, have the same requirement of the VOCA user. If use of the device in a certain setting impedes learning (for example, a student in training to be a dishwasher), recognize that and deal with it. Don't feel guilty about not letting the student use the VOCA in certain situations. You may be better safe than sorry.

Make Backups

Make overlay back-ups in case of spills and losses. Also keep copies of overlays on file for easier revisions.

Avoid Hazards

Be aware of the possible hazards of moisture and static electricity. Avoid water hazards, and ground the user when static seems a likely possibility. The static electricity that people acquire in dry atmospheres can be transmitted to objects they touch (in this case a VOCA) and can cause disruption in current and a malfunction of the system. Grounding yourself on a rubber surface, particularly if you are standing on an unpainted metal surface, is a worthwhile precaution. Another remedy to prevent static discharge when turning on the VOCA is to use an anti-static softener sheet (used in home dryers). There are several commercial products available to dissipate static electricity, including anti-static mats and sprays available at most computer stores.

Stay Calm

Become a calm, effective troubleshooter, checking first for the obvious: power supply, loose connections, adjustable device features (e.g., display and volume). Know when to call for help and trust that the technicians do want to help. Be brave and resourceful ... be a "teacher."

S-L12

VOCA TROUBLESHOOTING CHECKLIST

- Is the VOCA turned on?
- If there is a display control knob, does it need to be adjusted?
- If there is a volume control knob, or internal (software) setting, does this need to be changed or adjusted?
- Check to make sure that the overlay you are trying to use corresponds to the level or page of the program that you're in.
- Check to make sure that you are in the right "mode" (for example, spelling mode vs. language production mode).
- Does the VOCA use batteries? Have they been charged, or do they need to be charged?
- If the VOCA has been charged and still does not work, is there a short in the charger? Try using another charger. (*Please* make sure that you are using the charger that was designed for or came with your VOCA.)
- Does the device use rechargeable batteries? Have they been replaced recently? Even rechargeable batteries eventually must be replaced.
- If you are on an unpainted metal surface, *please* be sure that you ground yourself by using a rubber mat, before using your VOCA.
- Check the troubleshooting guide provided by your VOCA manufacturer.

When to Call for Help

If you need to call the vendor for assistance, it helps to have the telephone near the VOCA. Have the following information available:

- The VOCA type.
- Name, version, and serial number of the device.
- What happened or what didn't happen.
- The steps you have already taken or tried to solve the problem.

Keep serial numbers and names of equipment in a loose-leaf notebook with blank pages for recording problems and solutions.

PLEASE KEEP A COPY OF THIS CHECKLIST IN A CONVENIENT LOCATION!

APPENDIX A
GLOSSARY

It's exciting to embrace a new technology that holds so much promise, but there are moments of anxiety in tackling any new endeavor. Part of this anxiety occurs as you encounter new vocabulary. New fields breed new terms to express ideas or processes, and education is famous for its jargon. Just remember that the terms are simply labels for concepts that you learn — in fact, may already know. To take the edge off, here are a few definitions of some prevalent terms in the field of AAC.

Activation: VOCAs can be accessed in a variety of ways. The most straightforward is called *direct selection,* in which the student presses a selected key or cell and the machine "talks." Another type of direct selection involves *pointing* to the cell by means of a light, which activates the chosen cell. Devices can also be accessed by other remote means: (a) a single switch for scanning (pressure, motion, lever, etc.); (b) a panel or array of switches; and (c) a joystick, track ball, or mouse. Consistent, reliable activation is perhaps one of the most important elements in effective VOCA use. Therefore, it is paramount that both trainer and student work toward that end.

Adjustments and modifications: Most devices have adjustable features that are easy to manipulate and will give you some sense of power over this machine. Displays, as suggested before, can be modified, as well as volume. As the need arises, you and your team might want to provide some external modifications to make the device more functionally and cosmetically acceptable. Modifications that can be made include: homemade carrying cases, attached handles or easels, and attached pointers for greater pressure on the cells.

Dedicated device: Voice output communication is produced by some type of computer processor. When that processor's primary or exclusive function is to process and produce communication, it is considered dedicated. Because of the memory requirements to produce speech and to store codes for speech, currently most devices are dedicated. Therefore, you need to recognize that expecting other functions (such as calculating, timekeeping, recordkeeping, or word processing) from them is probably unrealistic. In some cases, the computer base of the device is well equipped to handle these tasks, but shifting from one program to another is risky.

Digitized speech: Speech that is produced from prerecorded speech samples, either as intact words or as segments of words. Flexibility to produce novel utterances depends on how many sounds have been recorded; therefore, the more sophisticated systems use a great deal of computer memory. Although digitized speech would seem to be more intelligible and of higher quality, other factors play into the overall effect, including the speaker system of the device.

Displays: This generally refers to an LCD (light cathode display) or LED (light emitting diode), which may well enhance the intelligibility of a device by giving feedback to the sender for self-correction and providing clarification to the message receiver. Most displays feature a control that can adjust the lines for viewing at various angles.

Fixed vocabulary: This term is somewhat misleading because it applies to two kinds of VOCAs. Fixed vocabularies are the words that are programmed into the device by the manufacturer. In some cases, these cannot be altered; in other cases, you may submit revisions for the manufacturer to reprogram.

Overlays: This refers to a word or picture page that is placed over the device to indicate which key or cell will produce the intended messages. Generally these overlays are gridded and may have either words or pictures representing concepts. These cues enable the student to locate and identify keys (cells) for specific message production. (These are analogous to letters on typewriter keys.) The overlay or overlays may also be removable or duplicated and serve as a ready-made communication aid when the actual device proves too cumbersome for some situations or is in need of repair.

Power supply: Currently devices have rechargeable batteries, but caution should be taken to make sure that they are charged the recommended amount of time with the correct cord. Frequent charging, when batteries have not been sufficiently discharged, may diminish the capacity of the battery to accept a full charge.

Programmable vocabulary: All vocabulary is "programmed"; however, this term refers to devices that can be programmed on site by trainer or student, as opposed to being returned to the manufacturer.

Synthesized speech: Speech that is produced by synthesizing (blending) a limited number of sound segments. Because it is simply a combination of established sounds, it tends to sound robotic.

VOCA: Voice output communication aid, generally a device that uses computer-generated speech for communication.

Volume control: This may refer to either a volume control dial affixed to the device, or volume control options within the VOCA software or program. In addition to volume controls, some VOCAs may include an ear jack for privacy or auditory feedback for people with visual impairments (for message selection).

APPENDIX B
DEVICES AND VENDORS

Adaptive Communication Systems, Inc.
354 Hookstown Grade Road
Clinton, PA 15206
800/247-3433; 412/264-2288
SpeechPAC, Alltalk, RealVoice, Dyna Vox, ScanPAC, EvalPac with RealVoice

Artic Technologies
55 Part Street, Suite 2
Troy, MI 48083-2753
313/588-7370
Artic D'Light, Artic Crystal

Audio Bionics
9817 Valley View Road
Eden Praire, MN 55344
800/328-4827, ext. 1400
Lifestyle Personal Communicator

Canon U.S.A., Inc.
One Canon Plaza
Lake Success, NY 11042
516/488-6700
Canon Communicator M

Crabapple Systems
803 Forrest Avenue
Portland, ME 04101
207/797-2388
SpeechBox, SpeechPad

Crestwood Company
6624 North Sidney Place
Milwaukee, WI 53209
414/352-5678; FAX: 414/352-5679
Portable Pocket Computer

EKEG Electronics Company, Ltd.
P.O. Box 46199, Station G
Vancouver, BC V6R 4G5 Canada
604/273-4358
Keyboards for Speak N' Spell

Eyegaze Computer System
LC Technologies, Inc.
4415 Glenn Rose Street
Fairfax, VA 22032
703/425-7509
Eye Controlled Communicator

F. Keep Company
22501 Mt. Eden Road
Saratoga, CA 95070
408/248-2579; 408/741-5368
CATT 425 and 525

Innocomp, Innovative Computer Applications
33195 Wagon Wheel
Solon, OH 44139
216/248-6206
Say-it-All II and II plus

Phonic Ear Inc.
250 Camino Alto
Mill Valley, CA 94941
800/227-0735; 415/383-4000
VOIS 136, VOIS 160

Prentke Romich Company
1022 Heyl Road
Wooster, OH 44691
800/642-8255; 216/262-1984 (Ohio)
IntroTalker, Smoothtalker for Light Talker and Touch Talker, Light Talker, Touch Talker

Sentient Systems Technology, Inc.
5001 Braum Boulevard
Pittsburgh, PA 15213
412/682-15213
EyeTyper 300

Shea Products, Inc.
1721 West Hamilton Road
Rochester Hills, MI 48309
313/852-4940
Special Friend Speech Prosthesis

Sonoma Developmental Center
Communication Engineering
15000 Arnold Drive
P.O. Box 1493
Eldridge, CA 95431
707/544-1573
Sonoma Voice

Dr. Douglas Sorenson
5937 Portland Avenue South
Minneapolis, MN 55417
612/866-1661
Rescue Speech System

TASH, Inc.
70 Gibson Drive Unit 12
Markham, ON, Canada, L3R 4C2
416/472-2212
Talk-O

Venture Technologies
110-340 Brooksbank Avenue
North Vancouver, B.C., Canada, V7J 2C1
604/986-9803; 800/663-8931 (In U.S.)
TurboSelect™

Wayne County Intermediate School District
Attention: Greg Turner
33500 Van Born Road
Wayne, MI 48184
313/467-1415
WOLF, ScanWolf

Words+, Inc.
P.O. Box 1229
44421 10th Street, West
Suite L
Lancaster, CA 93535
805/949-8331
AudScan II, Equalizer, Talking Board

Zygo Industries, Inc.
P.O. Box 1008
Portland, OR 97207
503/684-6006
Macaw, Lightwriter, Scribe, Zygo Talking Notebook II, Switchboard

Other

Inch Associates
9568 Hamilton Avenue
Suite 104
Huntington Beach, CA 92646
INCH Assessment (International Checklist for Augmentative Communication)

Don Johnston Developmental Equipment, Inc.
P.O. Box 639
1000 North Rand Road, Building 115
Wauconda, IL 60084
312/526-2682
Oakland Schools Picture Dictionary

APPENDIX C
RESOURCES

Journals and Newsletters

AAC: Augmentative and Alternative Communication Journal, Williams & Wilkins, P.O. Box 2391, Baltimore, MD 21203; 800/638-6423.

Augmentative Communication News, One Surf Way, Suite 215, Monterey, CA 93940.

Closing the Gap, P.O. Box 68, Henderson, MN 56044; 612/248-3204.

Communicating Together, Easter Seal Communication Institute, 250 Ferrand Drive, Suite 200, Don Mills, Ontario, Canada M3C 3P2.

Communication Outlook, % Artificial Language Laboratory, Computer Science Department MSU, East Lansing, MI 48824

Computer Disability News, National Easter Seal Society, 2023 W. Ogden Avenue, Chicago, IL 60612; 312/243-8400.

The Exceptional Parent, 1170 Commonwealth Avenue, Third Floor, Boston, MA 02134.

Organizations

Applied Science and Engineering Laboratories, University of Delaware/A.I. duPont Institute, 1600 Rockland Road, Wilmington, DE 19899; 302/651-6830.

ASHA (American Speech-Language-Hearing Association), 10801 Rockville Pike, Rockville, MD 20852-3279; 301/897-5700.

Council for Exceptional Children, 1920 Association Drive, Reston, VA 22091; 703/620-3660.

RESNA, 1101 Connecticut Avenue NW, Suite 700, Washington, DC 20036; 202/857-1199.

TASH (The Association for Persons with Severe Handicaps), 7010 Roosevelt Way N.E., Seattle, WA 98115; 206/523-8446.

Trace Research and Development Center, 314 Waisman Center, 1500 Highland Avenue, Madison, WI 53706-2280.

USSAAC (United States Society for Augmentative and Alternative Communications), % ISAAC, P.O. Box 1762, Station R, Toronto, Ontario, Canada M4G 4A3.

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ASHA (American Speech-Language-Hearing Association). (1986). *Augmentative communication: An introduction.* Rockville, MD: Author.

Bernstein, L. E. (Ed.). (1987). *The vocally impaired: Clinical practice and research.* New York: Academic Press.

Carlson, F. (1982). *Alternative methods of communication.* Danville, IL: Interstate Printers and Publishers.

Goosens, C. & Crain, S. *Augmentative communication intervention resource.* Wauconda, IL: Don Johnson Developmental Equipment.

McNaughton, S. (Ed.). (1985). *Communicating with blissymbolics.* Toronto: Blissymbolics Communication Institute.

Musselwhite, C. B. (1966). *Adaptive play for special needs children: Strategies to enhance communication and learning.* San Diego: College-Hill Press.

Musselwhite, C. R. (1982). *Communication programming for the severely handicapped: Vocal and non-vocal strategies.* San Diego: College-Hill Press.

Silverman, F. (1980). *Communication for the speechless.* Englewood Cliffs, NJ: Prentice-Hall.

APPENDIX D

(This appendix is a partial printing of a Tech Use Guide developed for the Center for Special Education Technology by Beth Mineo.)

Tech Use Guide — Using Computer Technology

Augmentative and Alternative Communication

Augmentative and alternative communication (AAC) refers to any approach designed to support, enhance, or augment the communication of individuals who are not independent communicators in all situations (Beukelman, Yoder, & Dowden, 1985). Communication augmentation is appropriate for those who experience difficulty with the spoken and/or written forms of expressive communication. It is important to note that an individual's communication system should not be a single device or technique, but rather a collection of techniques, devices, and strategies that can be employed as the communicative situation warrants. Components of this collection include gestures, facial expression, writing, residual speech, signal systems, nonelectronic communication systems of various sizes and complexity, and electronic AAC technology.

Benefiting from AAC Approaches

AAC approaches benefit individuals with severe difficulties in speaking and/or writing. For those whose oral-motor dysfunction is so severe that speech is not intelligible, AAC approaches provide an alternate method of expression. Individuals with limited arm and hand movements can take advantage of alternate access to print capabilities. AAC approaches with spoken output can assist individuals with low vision, and AAC systems with visual display and print capabilities can assist individuals with hearing impairments. AAC approaches may also be beneficial for individuals with cognitive impairments, not only as a means of expressive communication but also as a language learning tool.

"Low Tech" Approaches

There are many AAC approaches that do not involve sophisticated technology. These approaches may be implemented in isolation, but they more often serve as components in a comprehensive AAC intervention.

Signal Systems. These systems permit an individual to call for help, attract attention, and answer simple yes/no questions. Such systems usually consist of a switch and a signal of some type. The switch is placed in proximity to a body part that the user can move easily and reliably. The signal could be a buzzer or chime, or it could be a tape-loop saying "Come here" or "I need help." Some individuals may be able to use the signal for simple coded messages (for example, one buzz means yes, two buzzes means no, three buzzes means I don't know) or for Morse code.

Communication Boards. This term refers to any display containing vocabulary choices from which the user selects a message. Low tech communication boards are those without electronic components. They can be made using a variety of materials, including wood, plexiglass, posterboard, notebooks, and paper. Communication board displays may contain objects, letters and numbers, words, phrases, photographs, or graphic representations. Brandenburg and Vanderheiden (1988) summarized the many factors that must be considered in the design of a communication board. These include:

- The physical technique the individual will use to select message components from the display.
- The types of symbols to be used on the display.
- The vocabulary items to be included.
- The arrangement of vocabulary on the display.
- The interaction strategies that the augmented communicator will use.
- The attitudes and communication styles of the augmented communicator and potential communication partners.

An individual might have a single board that contains letters and numbers and enough words and frequently occurring phrases to meet most of his communication needs. A student might use different mini-boards for different academic subjects or for different settings (playground, mall, Sunday school). Communication boards also serve as a back-up system should the user's electronic system fail.

"High Tech" Approaches

The incorporation of microprocessor technology into AAC systems has made a number of valuable features possible.

Large Vocabulary. Many AAC systems offer vocabulary capacities in excess of 2,000 entries. The challenge for the user is the management of such large vocabularies, because most systems have static displays containing a finite (and relatively small) number of items. Systems such as *Say-it-All II Plus, scanWRITER*, and *VOIS 160* store vocabulary at a number of levels, requiring the user to activate the appropriate level as well as the correct location on the display in order to make a message selection. Users often consult a glossary that lists available vocabulary along with the activations that are required to access each item.

Several approaches have been designed to minimize the memory demands on the user. All of the devices mentioned thus far can accommodate multiple overlays, one corresponding to each memory level. A new device, *The Talking Screen*, offers a dynamic display — the display itself changes, permitting each level to be displayed without any manual changing of overlays. *The Touchtalker with Minspeak* uses multimeaning icons to facilitate access to vocabulary items not visible on the display. The user codes his vocabulary selections with meaningful sequences of pictures, and thus doesn't need to remember a large number of letter or number codes.

Output Displays. Many devices contain LED or LCD areas for display of messages. As the user makes a selection, the words appear in the display. This permits the user to review the message, and serves as a medium for the communication exchange between partners. Many systems also generate hard copy (print on paper), a useful feature when a permanent record of communication is desired.

Speech Output. One of the most significant advances in AAC has been the availability of spoken output. Speech output renders technology accessible to those who cannot read and those with visual impairments. It also makes communication possible in the traditional auditory modality. Some devices, like the *Mini Talking Card Reader*, record short segments of a speaker's voice onto magnetic tape. Devices like the *Wolf* and *Touchtalker* produce synthesized speech, which is created by subjecting text to a set of pronunciation rules.

The appeal of synthesized speech is its flexibility. Any utterance that can be entered as a text string can be produced, resulting in the potential for unlimited vocabulary. The sophistication of speech synthesizers varies, as does the quality of the speech they produce. Generally, research has demonstrated that *Echo*, *Votrax*, and *Smoothtalker* speech are significantly less intelligible than *DECtalk* speech (Mirenda & Beukelman, 1987).

An alternative to synthesized speech is digitized speech. In this approach, the speech is digitally recorded, modified for storage in the system, and then reconstructed as spoken output. Although this process yields much more natural-sounding speech, it is very memory-intensive. It is also less flexible than synthesized speech because only prerecorded output can be used. Among the AAC systems offering digitized speech capabilities are the *Introtalker*, *ALLTALK*, and *Parrot*.

Input Modes. Advances in input technology facilitate access to AAC systems for individuals with the most severe motoric limitations: almost any physical movement now can be harnessed to control communication systems. For example, the *P-Switch* can be activated by almost any muscle movement and can be used to control scanning communications systems. *Voicescribe-1000*, a voice input system with a potential 1,000-word vocabulary, can be used by individuals with consistent vocal output who need to access written communication options. *Freewheel* is a cordless device that allows head-pointing and other body motions to be used to access standard software on a personal computer.

Rate Enhancement Techniques. Several AAC systems incorporate features that improve the efficiency of communication for the user. Prediction routines, such as those found in the *Portable Anticipatory Communication Aid* (PACA) and *Equalizer*, learn the word usage frequencies of the user. When the user begins entering a word, the system responds with the most frequently used words beginning with that letter sequence. Abbreviation routines, as found in the *RealVoice*, allow the user to access items in memory using abbreviation. For instance, the system might be programmed to produce "See you later" with the single keystrokes "C-U."

Customizability. Each individual has unique communication needs, and it is important to be able to customize a system to meet those needs. Many systems come with a standard vocabulary, but allow the user or caregiver to program in additional vocabulary as needed. Similarly, most systems offer the consumer the option of customizing overlays to make them appropriate to the user's cognitive and linguistic abilities.

Assessment and Intervention

Every user presents a unique constellation of needs and abilities, and the range of available AAC systems expands yearly. The process of matching user needs to appropriate interventions should involve thorough evaluation and careful consideration of options.

Potential consumers of AAC interventions may demonstrate deficiencies in motor abilities, cognitive abilities, language skills, social/emotional development, and performance of activities of daily living. All of these areas should be evaluated, because AAC intervention will be affected by them and will in turn exert some influence on them. The need for such a comprehensive approach requires that input be derived from a multitude of sources. A team approach is essential, with expertise being shared among parents, potential AAC consumers, teachers, aides, speech/language pathologist, occupational therapists, physical therapists, medical personnel, ophthamologists, audiologists, educational diagnosticians, psychologists, social workers, rehabilitation engineers, and others with pertinent input. Several protocols have been developed to guide the assessment process (see Beukelman, Yorkston, & Dowden, 1985 and Blackstone, Cassatt-James, & Bruskin, 1988).

It should be emphasized that AAC assessment and intervention are not discrete events, but rather components of the process of assisting an individual to reach his or her highest potential. Contrary to popular belief, the process is not completed when a consumer acquires an AAC system. Understanding of AAC has matured in the past decade, and most people now realize that successful communication abilities do not emerge automatically as a function of device acquisition. Communication skills must be taught, with the goal being the achievement of **communicative competence**. Light (1989) defines a competent communicator as one whose communication is functional, adequate, and skilled in regard to the linguistic, operational, social, and strategic aspects of communication. A competent communicator is one whose communication can meet the demands of daily life. The communication does not have to be perfect, because no one is a perfect communicator. Rather, the user should demonstrate an adequate grasp of vocabulary and grammar, adequate operation of the AAC systems, appropriate interaction skills, and the ability to employ compensatory strategies to enhance communicative effectiveness.

Attention should be directed toward all of these abilities during training. Furthermore, training should be provided not only for the augmented communicator, but for the communication partners as well. Caregiver training could almost be considered a prerequisite for success. Without interested, encouraging, skillful partners, many of the augmented communicator's opportunities for learning and practice would be lost. Given the importance of early success to later motivation and effort, it is essential that training be directed at both sides of the communication dyad.

Crucial Intervention Issues

Training Interaction Strategies. So often people with severe expressive communication problems learn to assume a passive role in communication interactions. They get lots of practice responding, but little experience initiating. Thus, AAC intervention must include explicit instruction in interaction behaviors and strategies. AAC consumers must learn that there is no single correct way to interact with all communication partners: The interaction strategies employed should be selected on the basis of the communication task, the setting, and the skills and attitudes of the partner. Consumers must learn how to get attention, introduce topics, negotiate meaning, interrupt, convey emotion, take turns, and resolve communication breakdowns. They need to learn to work with their communication partners to maximize the successful transfer of information. Kraat (1987) provides an excellent overview of this topic.

Promoting Language and Literacy Skills. The lack of language and literacy skills limits an individual's AAC options. Systems based on spelling, or those requiring knowledge of morphological and syntactic conventions, are inaccessible to individuals without sufficient language and literacy skills. Difficulties with these skills often hold students back from academic achievement and prevent adults from performing adequately at the job site. This topic has just recently begun to be addressed in the literature. Blau (1988) suggested a four-phase approach to developing literacy in young children that emphasizes a positive reading experience, development of a sight work vocabulary, an introduction to phonics, and the development of sentence comprehension. Very young children who have had access to a symbol-based communication system may have an inherent understanding of symbolic representation, lessening the difficulty of the transition to the written word.

Children who are nonspeaking do not have the opportunity to practice sound/letter correspondence orally, so interventionists must emphasize these relationships in other ways. Access to an AAC system may provide an individual with his first opportunities to experiment with sound combinations (if the system has voice output) and language manipulation. Cohen (1988) suggests ways in which word processing software developed for the regular education market can facilitate the development of literacy skills.

Vocabulary Selection. An AAC consumer's communicative effectiveness and efficiency can be enhanced if the system provides access to the appropriate vocabulary. There are many techniques that one can use in making vocabulary determinations. In all cases, it is crucial to approach this task in terms of what the consumer wants and needs. Yorkston and her colleagues (1989) described several methods to employ when selecting vocabulary:

Environmental inventories — This approach to vocabulary selection involves a survey of each of the environments in which the AAC consumer interacts to determine the people and objects present and the activities that are likely to occur. From these observations, lists of potential vocabulary items can be generated.

Communication diaries — AAC system vocabulary should be updated frequently to reflect changes in the user's lifestyle and communicative interactions. To facilitate this updating, the consumer can compile a history of communications either by printing and saving all output (if the system has this capability) or by having someone record the communications for a period of time. Analysis of this record will reveal those items used frequently that are not available in the vocabulary.

Vocabulary list review — Another excellent technique is the review of vocabulary lists. It is difficult to generate vocabulary items spontaneously, but much easier to recognize appropriate words on a list. A review of standard lists is also helpful in identifying the structural words essential for grammatically correct utterances. Often these words are overlooked because the focus is on listing words that will expand the content of a user's communication.

Blau (1986) offers some guidelines for evaluating the utility of selected vocabulary. Among her criteria are:

- Can the item be used to code a variety of communicative functions?
- What is the potential for recombination of the item?
- How frequently is the item used, and in what settings?
- How much information is conveyed by the item?
- How high in reinforcement value is the item for the consumer?
- Does the item have potential for peer interaction and play?
- How much interest does the item hold for the consumer?

In determination of vocabulary, as in all aspects of assessment and intervention, the consumer should be involved in the process to the greatest extent possible.

Availability Information

Trace Resourcebook: Assistive Technologies for Communication, Control & Computer Access. Available from the Trace Center, address above.

Wallchart on Commercially-Available Communication Aids. Available from Applied Science and Engineering Laboratories, address above.

Assistive Technology Sourcebook. Available from RESNA, address above.

ABLEDATA (product database). Available from Adaptive Equipment Center, Newington Children's Hospital, 181 East Cedar Street, Newington, CT 06222, 800/344-5405.

Products Mentioned in Text

ALLTALK, FreeWheel, RealVoice. Adaptive Communication Systems, Inc., 354 Hookstown Grade Road, Clinton, PA 15026, 412/264-2288.

Mini Talking Card Reader. Crestwood Company, P.O. Box 04606, Milwaukee, WI 53205, 414/461-9876.

Voicescribe-1000. Dragon Systems, Inc., 55 Chapel Street, Newton, MA 02158, 617/965-5200.

Say-It-All II Plus. Innocomp, 33195 Wagon Wheel, Solon, OH 4439, 216/248-6206.

VOIS 160. Phonic Ear Inc., 250 Camino Alto, Mill Valley, CA 94941, 415/383-4000.

Introtalker, Touchtalker, P-Switch. Prentke Romich Company, 1022 Heyl Road, Wooster, OH 44691, 216/262-1984.

Equalizer, Talking Screen. Words +, Inc., P.O. Box 1229, Lancaster, CA 93535, 805/949-8331.

Parrot, scanWRITER, PACA. Zygo Industries, Inc., P.O. Box 1008, Portland, OR 97207, 503/684-6006.

Readings

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Light, J. (1989). Toward a definition of communicative competence for individuals using augmentative and alternative communication systems. *Augmentative and Alternative Communication,* 5, 137-144.

Mirenda, P. & Beukelman, D. R. (1987). A comparison of speech synthesis intelligibility with listeners from three age groups. *Augmentative and Alternative Communication,* 3, 120-128.

Mirenda, P. & Mathy-Laikko, P. (1989). Augmentative and alternative communication applications for persons with severe congenital communication disorders: An introduction. *Augmentative and Alternative Communication,* 5, 3-13.

Yorkston, K. M., Honsinger, M. J., Dowden, P. A., & Marriner, N. (1989). Vocabulary selection: A case report. *Augmentative and Alternative Communication,* 5, 101-108.

This guide was prepared by Beth Mineo. Dr. Mineo is employed as a certified speech/language pathologist and an associate scientist at the Applied Science and Engineering Laboratories. University of Delaware/ A. I. duPont Institute. She is also an assistant professor in Educational Studies, University of Delaware. She brings many years of clinical experience ranging from her work in preschool, public school, a rehabilitation hospital, ICF/MR facilities, and private practice. She has been involved in the development and evaluation of a variety of assistive technology devices.

SORTING THROUGH AUGMENTATIVE COMMUNICATION
MOFFITT & DETERDING, 1990

	ACCESS		FLEXIBILITY				SYMBOL USE					VOICE			COST		
Equipment	direct	non-direct	user program ability	vocabulary size	printed output built-in	opt.	visual output	pict	word	letter number	gender avail.	pitch varia.	volume control	intelligibility (subj. scale 1-5)	dig/ syn	Approximate Cost	MAN/ Ven#
Light Talker	x	x	x	Virtually Unlimited Mult. softw. pkgs. avail.		x	LED	x	x	x	(x with new voice)	x	x	4-5	S	$4290 - (new voice $300)	11
Talker II	x		x	250 store text/speech			x	x	x			x	Digital 7 levels	3-4	S	$2495	6
Sonoma Voice	x		Programmed by manufacturer	64-256 phrases				x	x	x			x	4	S	$414-440	14
Touch Talker	x		x	Virtually Unlimited Mult. softw. pkgs. avail.		x	LED	x	x	x	(x with new voice)	x	x	4-5	S	$3695 - (new voice $300)	11
All Talk	x		x	Level I- 600 words Level II- 1200 words				x	x	x	x	(x)	x	4-5	D	$2995 Lev. I $3995 Lev. II	1
Wolf	x		x	User 800 words, fixed 500 words				x	x	x				3-4	S	$275	20
Scanwolf		x	x	User 800 words, fixed 500 words				x	x	x				3-4	S	$375	20
Vocaid	x		Preprogrammed	5 overlays 36 squares				x	x	x				5	S	$148 - 300	3, 7, 16, 17
Speech Friend Speech Prosthesis	x	x	x	26 x 26 memory loc.			LCD	x	x	x		low med, hi	x	4	S	$2390 Direct $3250 Scanning	13
Lightwriter	x		Limited	12 stored phrases, 33 words, 20 keys, 250 char. ea.	x		2 LED user > listener			x		x	x	3-4	S	$5500	23
VOIS 160	x		x	Virtually Unlimited			x	x	x	x				4-5	S	$3595	9
Zygo Talking Notebook II	x		x	Virtually Unlimited		x	x			x		x	x	4	S	$1495 - 2495	23
PACA		x	x	750 word memory 55 x 20 charac. line	x				x				x	4	S	$2850	23
Tiger, Jr.	x		Preprogrammed	375 words need Magic				x	x				opt.	3-4	S	$150	18

	ACCESS		FLEXIBILITY				SYMBOL USE					VOICE			COST		
Equipment	direct	non-direct	user program ability	vocabulary size	printed output built-in	opt.	visual output	pict	word	letter number	gender avail.	pitch varia.	volume control	intelligibility (subj. scale 1-5)	dig/ syn	Approximate Cost	MAN/ Ven#
Talk-O	x purch.	x separately	x	120 sec. recording time				vary	by	access method	x	(x)	x	5	D	$2300	16
Speech Pad (converted Power Pad)	x		x	16-255 words or phrases				x	x	x				4-5	S	$899	24
Secretary	x		x	32 sec. 10 brief messages	x		x				x	(x)		5	D	$1995	23
Say-it-Simply Plus	x		x	762 words or phrases						x	x		x	4-5	S	$1350 (1989)	5
Say-it-All II Plus	x		x	846 words or phrases		x	x (opt)			x	x		x	4-5	S	$1595 (1989)	5
Real Voice (Speechpac)	x		x	27,000 characters Virtually Unlimited	x		x	x	x	x	x	x	x	4-5	S	$2895	1
CATT 425	x		x	32 sec.			x (opt)	x	x	x	(x)	(x)	x	5	D	$695	25
Macaw	x		x	1 min (hq) 2 min (ep)						x	x	(x)	x	5	D	$995	23
Scanning Macaw	x	x	x	1 min (hq) 2 min (ep)						x	x	(x)	x	5	D	$1495	23
Eyetyper 300	x eye-gaze		x	Virtually Unlimited		x	x			x			x	3-4	S	$3495	12
IntroTalker	x		x	1 min (norm) 2 min (ep)				x	x	x	x	(x)	x	5	D	$795	11
EvalPac, with Real voice	x	x	x	27,000 characters Virtually Unlimited	x		x	x	x	x	x	x	x	4-5	S	$3995	1
Parrot	x		x	32 sec 16 messages						x	x	(x)	x	5	D	$595	23
CATT 525	x		x	120 pre-programmed + 10 brief messages open			x (opt)	x	x	x			x	3-4	S	$695	25
Scanning IntroTalker		x	x	1 min (norm) 2 min (ep)				x	x	x	x	(x)	x	5	D	$995	11

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STEPS IN VOCABULARY SELECTION

1. Assess the receptive and expressive language skills of the student using the current AAC aid or technique.

2. Interview significant people in the student's life regarding the appropriateness and effectiveness of the vocabulary previously selected.

3. Review present vocabulary to determine the frequency of use of each symbol/word/phrase/sentence.

4. Evaluate sample lexicons. A lexicon may include alphabet for spelling single words, carrier phrases, or complete sentences.

The vocabulary and lexicon should permit a variety in discourse functions:

=> Plan for power or the opportunity for conversation control (e.g., "That's not what I meant.")

=> Social conversation with peers and interaction with strangers.

=> What words would allow the student to give answers — at home, at school, or among strangers?

=> Is there vocabulary that allows the student to ask questions?

=> List statements that allow:
   a. control of the interaction (e.g., "Ask me a different question.")
   b. guide the listener in the use of the system (e.g., "Adjusting my viewing angle knob. Read my display.")
   c. add flavor to the conversation (e.g., "I don't agree.")
   d. meet physical needs (e.g., "Help me into bed.")

=> Include interjections (e.g., "Good grief! Get a grip on it, Mom!")

=> Provide comments that cue the student's parents to include them in conversation (e.g., "Do you want my opinion? Here's my two cent's worth.")

=> Include high frequency carrier phrases like "I want to ..." with a wide variety of possible filler words (e.g., "eat lunch, go home").

=> For each different setting or environment, identify vocabulary specific to that situation.

=> Select words that represent a variety of different grammatical classes that can be combined in a variety of ways.

FOR A YOUNGER CHILD
Select vocabulary by evaluating activities the child enjoys and can be modified to be more interactive. Consider words for objects and actions that can be requested, people with whom they play, and descriptions of feelings or comments about an activity. Concentrate more on nouns, verbs, and modifiers as opposed to articles, verb tenses, etc.

5. Discuss with the team the functions of the vocabulary.
    a. To give answers
    b. To communicate socially with friends
    c. To participate in social group activities
    d. To communicate efficiently in public
    e. To communicate quickly in all situations
    f. To express novel ideas academically or socially
    g. To express basic needs

6. Identify five of the student's most preferred activities (e.g., eating at fast food restaurants, playing with siblings, scouting, bowling, etc.).

7. Introduce five methods for compiling a functional vocabulary. Select messages with multiple versatility and use — to be used in more than one situation.
    a. **Dialoguing** — choose a familiar routine, and document what the student and his communication partner say to each other during their interaction
    b. **Environmental inventory** — choose a preferred activity and list appropriate words and phrases that the student and his communication partner might say.
    c. **Shadow** — observe the student throughout an activity and record verbatim the sentences produced.
    d. **Role play** — partners act out a situation and record the vocabulary necessary to participate in the interaction.
    e. **Tape record** — through audio or video observation the partners list vocabulary specific to the activity as well as a more generic vocabulary.

Vocabulary selection is an ongoing process and must be re-evaluated and updated as needed.

Adapted from: *Training Caregivers and Facilitators to Select Vocabulary*, Gail Van Tatenhove, March, 1987.

TEN WISHES FROM A STUDENT WHO USES AUGMENTATIVE COMMUNICATION

To help you understand the feelings and thoughts of a student who uses augmentative aids and techniques, children from across the United States were asked, "If you could wish for one thing your teacher would do for you, what would it be?" Below are some of their answers.

1. I wish my teacher would joke with me.
2. I wish my teacher would learn how to work my communication aid.
3. I wish my teacher would stop shouting at me like I can't hear.
4. I wish my teacher wouldn't have a heart attack when my machine doesn't work.
5. I wish my teacher would remember that I don't always spell very well.
6. I wish my teacher would have more patience with me.
7. I wish my teacher would call on me for "Share Day."
8. I wish my teacher would give me enough time to say what I'm thinking.
9. I wish my teacher wouldn't hit my machine when it doesn't work — That's my mouth she's hitting!
10. I wish I could walk and talk like my sister and brother.

LEVEL: STAFF

GOAL: #5 Gain an overview of augmentative/alternative communication (AAC) system as a means of meeting the needs of young children with severe communication difficulties.

COMPETENCY TYPE: SKILL

OBJECTIVE: Participants will utilize an AAC device to store and send simple messages.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
1. Large group activity Demonstrate one or two simple AAC systems which may be appropriate for use with young children (e.g., Manual Board, Introtalker, Wolf). Manual Board: Describe how it could be used in classroom or for play activity. Electronic Device: Demonstrate storage of a simple message under a symbol/icon and show how it can be retrieved.	1. Gain access to one or two AAC systems from your local SERRC or ORCLISH.	1. Demonstration of both a nonelectronic manual board and electronic voice output device will give participants a better understanding of both "high" and "low" tech AAC applications. If the leader is familiar with scanning and switch use, a device such as Scan Wolf or Scanning Introtalker can be discussed or demonstrated. Leader may also want to mention and/or demonstrate other methods used for selection, such as use of adapted hand pointers, head/chin pointers, light or infrared beam, eye gaze, etc.
2. Individual or small group activity Participants will follow step-by-step instructions to store and retrieve messages on a simple electronic device for a typical preschool playtime interaction. For example: *Initiator:* Let's play with the blocks! *Responder:* What should we make? *Initiator:* Let's make a house! *Responder:* I want a big house!	2. Introtalker (Prentke Romich) is ideal for this activity. Instructions for storage and retrieval are on the back of the device.	

LEVEL: STAFF

GOAL: #5 Gain an overview of augmentative/alternative communication (AAC) system as a means of meeting the needs of young children with severe communication difficulties.

COMPETENCY TYPE: VALUE/ATTITUDE

OBJECTIVE: Participants will develop an appreciation of the critical need on the part of young children with severe communication difficulties to have access to functional and appropriate AAC systems.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
1. Large or small group activity Ask participants to name activities that are typical of a preschool curriculum that involve expressive communication on the part of children. Record on a Flip Chart or Transparency. Secondly, ask participants to name activities typical of a preschool curriculum for which no communication is necessary.	1. Flip Chart and markers, or blank Transparency.	1. The purpose of this activity is to bring about full realization that communication is an integral part of all that typically occurs in the early childhood educational setting. The child who cannot participate due to an inability to communicate suffers a profound disadvantage which will negatively impact all aspects of development.
2. Large group activity Ask participants to name particular skills which may not develop at a normal rate when communication is not functional. Record on Flip Chart or Transparency.	2. Flip Chart and markers, or blank Transparency.	2. Be sure skills from all domains (e.g., cognitive, self-help, social-emotional, etc.) are mentioned.
3. Small group activity Divide into pairs. Partners are instructed to each take a turn acting out a charade (e.g., a movie title, song, current event, etc.) to the other person. They must communicate the message strictly through nonverbal means — no speech allowed! Partners must try to decipher the message being communicated nonverbally. Ask participants to describe their feelings (e.g., frustration) in attempting to communicate without the availability of speech.	3. Movie titles, songs, or current events on slips of paper — or have participants make up their own.	

LEVEL: STAFF *(continued)*

GOAL: **#5** Gain an overview of augmentative/alternative communication (AAC) system as a means of meeting the needs of young children with severe communication difficulties.

COMPETENCY TYPE: VALUE/ATTITUDE *(continued)*

OBJECTIVE: Participants will develop an appreciation of the critical need on the part of young children with severe communication difficulties to have access to functional and appropriate AAC systems.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
4. Large group activity Present the following ideas and discuss: a. Without a way to communicate, children can experience intense frustration. b. Without a way to interact, children can experience intense feelings of helplessness. c. Frustration and helplessness tend to lead to passivity, "learned helplessness," and other behavior problems.		4. If time permits, describe a specific child's social/emotional/behavior effects, or ask for example(s) from participants.
5. Using the Handout/Transparency as a guide, point out the ways that an appropriate AAC system can break these cycles of secondary delays in developmental progress and subsequent behavior difficulties. Briefly highlight the areas of development which can be enhanced through the use of an appropriate and functional AAC system.	5. Handout/Transparency (S-H33, S-T7) *Critical Early Childhood Developmental Skills Facilitated Through Use of AAC*	

S-H33

CRITICAL EARLY CHILDHOOD DEVELOPMENTAL SKILLS FACILITATED THROUGH USE OF AAC

- Awareness of cause and effect
- Comprehending means to an end and learning to initiate requests
- Indicating preference
- Participating in songs and nursery rhymes
- Creative, exploratory play, including role-play
- Conveying messages; learning communication responsibility
- Participating in "circle" routine activities
- Acquiring and displaying social rituals
- Beginning to memorize series, such as days of the week

Adapted from Suddath, C. & Susnik, J., *Augmentative Communication Devices*, CEC Center for Special Education Technology, 1991

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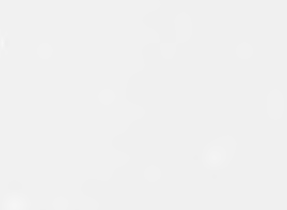
Technology



GOAL 6

LEVEL: STAFF

GOAL: **#6** Gain practical information regarding obtaining funding for assistive technology devices and services.

COMPETENCY TYPE: KNOWLEDGE

OBJECTIVE: Participants will become familiar with a four-step process to seeking and obtaining funding, several primary sources of funding, and key strategies.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
1. Large group activity Discuss a process for obtaining funding. State that although funding can be very complex and time-consuming, it can be made much easier through the gaining of appropriate information regarding the process, and of course, a dedicated and patient advocate! Using Transparency S-T8, *Four Steps to Funding,* briefly overview the four-step process. Highlight the following: **Step 1: Assessment** — Be sure to highlight the importance of a thorough evaluation, consideration of future needs, determination of various possible devices or approaches, and trial periods with devices determined to be appropriate.	1. For purposes of this presentation, *Steps to Funding; General Information and Resources for Obtaining Augmentative and Alternative Communication Aids and Services in Ohio* can be obtained. For copies, contact: Diane Dynes, Speech Pathology Department, St. Elizabeth Rehabilitation Center, 601 Edwin Moses Blvd., Dayton, OH 45408. Price is $1.00 per booklet with reduced prices based on number ordered. Your local SERRC Center may also have these available — contact the ORCLISH contact person at your local SERRC. Transparency (S-T8) *Four Steps to Funding* Leader Notes (S-L13) *Funding in Ohio*	1. Transparency S-T8 highlights the booklet described under resources. Additional information regarding several of the Ohio agencies discussed in this section can be found in Leader Notes S-L13. This information is provided for the presenter's benefit, and does not represent a full sampling of possible funding sources nor an entirely complete set of information on these particular agencies.

LEVEL: STAFF *(continued)*

GOAL: **#6** Gain practical information regarding obtaining funding for assistive technology devices and services.

COMPETENCY TYPE: KNOWLEDGE *(continued)*

OBJECTIVE: Participants will become familiar with a four-step process to seeking and obtaining funding, several primary sources of funding, and key strategies.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
Step 2: Determining a Funding Advocate and Developing Funding Strategies — Cite the fact that research has shown that the most critical component of the funding process is the determination of a funding advocate. Highlight the variety of individual factors which must be considered in developing a funding strategy. Emphasize that cost should never preclude the selection of the most appropriate system. Emphasize that the advocate must explore all possible options, and based on an understanding of these resources, develop a plan of prioritization.		
Step 3: Applying to Funding Sources — Review the strategies on Transparency S-T9, *Useful Strategies When Applying for Funding*	Transparency (S-T9) *Useful Strategies When Applying for Funding*	
Review Transparency S-T10, *Supportive Documents for Funding Requests.* If time permits, share and/or review Handout S-H34.	Transparency (S-T10) *Supportive Documents for Funding Requests* Optional Handout (S-H34) *Outlines for Letters of Medical Necessity/ Sample Letters*	
Using Transparency S-T11, *Medical Programs,* review these sources and emphasize that medical programs are always the first source to explore. Highlight the two key ingredients regarding the idea of	Transparency (S-T11) *Medical Programs*	

LEVEL: STAFF *(continued)*

GOAL: ***#6*** Gain practical information regarding obtaining funding for assistive technology devices and services.

COMPETENCY TYPE: KNOWLEDGE *(continued)*

OBJECTIVE: Participants will become familiar with a four-step process to seeking and obtaining funding, several primary sources of funding, and key strategies.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
speech prosthesis and the need to communicate medical needs. Emphasize that while medical claims may be denied, the appeals process is available for further pursual. Next, using Transparency S-T12, *State and Government Agencies,* review pertinent ones. Emphasize that these agencies may also be important channels to pursue if the individual meets given criteria, based on family income level, specific diagnosis, type of services needed, etc. Point out that many of the agencies listed in the booklet may not be appropriate for young children. Point out that BVR will be an important resource in later years when vocational goals may be used to support requests for funding.	Transparency (S-T12) *State and Government Agencies*	
In reviewing the *public schools' responsibility,* emphasize that the school may be responsible for providing assistive technology if the IEP team determines it to be necessary in order for a particular child to receive a "free appropriate public education."		Further elaboration of the public schools' responsibility for provision of assistive technology devices and services can be found in the Administrative section of Goal 6.

LEVEL: STAFF *(continued)*

GOAL: **#6** Gain practical information regarding obtaining funding for assistive technology devices and services.

COMPETENCY TYPE: KNOWLEDGE *(continued)*

OBJECTIVE: Participants will become familiar with a four-step process to seeking and obtaining funding, several primary sources of funding, and key strategies.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
Point out the major disadvantage: the child usually does not have access to the device outside of classroom time, and looses access to it should he/she move out of that particular district.		
Point out that *Trust Funds, Foundations, and Corporations* (Transparency S-T13) is the next source for pursual. While some research is necessary, many advocates have been pleasantly surprised to find large sums of money available for the asking.	Transparency (S-T13) *Trust Funds, Foundations, and Corporations*	
With Transparency S-T14, point out that *Nonprofit and Service Groups* should be the next on the list for pursual. Emphasize that these organizations are often excellent sources of information regarding other sources of available funding. Point out how these groups may be challenged to match contributions from other sources.	Transparency (S-T14) *Nonprofit and Service Groups*	
With Transparency S-T15, review *Fundraisers, Wish-Makers, and Public Appeal,* emphasizing that public appeal should be considered only after all other sources have been exhausted.	Transparency (S-T15) *Fundraisers, Wish-Makers, and Public Appeal*	

LEVEL: STAFF *(continued)*

GOAL: **#6** Gain practical information regarding obtaining funding for assistive technology devices and services.

COMPETENCY TYPE: KNOWLEDGE *(continued)*

OBJECTIVE: Participants will become familiar with a four-step process to seeking and obtaining funding, several primary sources of funding, and key strategies.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
Step 4: Follow-Up — Returning to Transparency S-T8, present follow-up as a critically important step in the (ongoing) process. This may involve evaluating how well the proposed solution is helping to solve the original problem, ensuring that training for the student and adults is taking place, making necessary modifications to equipment and/or its use, and ensuring that its use is being integrated within all areas of the students functioning.	Transparency (S-T8) *Four Steps to Funding*	
2. Summarize by presenting Transparency S-T16, *Funding Steps.* Give participants Handouts S-H35, 36, and 37 for their future reference.	2. Transparency (S-T16) *Funding Steps* Handouts (S-H35, 36, and 37) *Funding* *Funding Devices and Services in Augmentative and Alternative Communication* *Funding Agencies and Resources*	

S-T8

FOUR STEPS TO FUNDING

Step One:
ASSESSMENT

Step Two:
FUNDING ADVOCATE
and
DEVELOPING STRATEGIES

Step three:
APPLYING TO SOURCES

Step four:
FOLLOW-UP

FUNDING IN OHIO

Bureau for Children with Medical Handicaps
246 N. High St.
P.O. Box 1603
Columbus, OH 43266

For information contact:
General Information
614/466-1700

Description:
Bureau for children with Medical Handicaps provides diagnostic and treatment services to children from birth to 21 years of age with physical handicaps or certain chronic illnesses.

Eligibility Criteria:
Diagnostic services are available to children up to their 21st birthday with no financial eligibility. Treatment services are provided based on medical diagnosis, and family income.

Principal Disabilities Served

- ☐ ALS
- ■ Amputation
- ■ Blind
- ■ Cerebral Palsy
- ■ Deaf
- ☐ Mental Retardation
- ☐ Multiple Sclerosis
- ☐ Muscular Dystrophy
- ☐ Musculo-Skeletal Injury
- ☐ Other Neuromuscular Diseases
- ■ Spina Bifida
- ■ Spinal Cord Injury
- ■ Traumatic Head Injury
- ■ Other
- ☐ All of the Above

Principal Technology Services Funded

- ☐ Information
- ☐ Referral
- ■ Assessment
- ☐ Recommendations
- ☐ Ordering
- ☐ Fitting
- ■ Fabrication
- ■ Evaluation
- ☐ Training
- ■ Maintenance/Repair
- ■ Follow-Up
- ■ Equipment (see below)
- ☐ Other

Primary Areas of Equipment Funded

- ☐ Aids for Daily Living
- ■ Augmentative Communication
- ☐ Computer Applications
- ☐ Environmental Control Systems
- ☐ Home/Worksite Modifications
- ■ Prosthetics and Orthotics
- ☐ Seating and Positioning
- ■ Aids for Vision/Hearing Impaired
- ■ Wheelchairs/Mobility Aids
- ☐ Vehicle Modifications
- ☐ Other

Services and/or Equipment Typically Not Funded:
Environmental modifications: education related items; vehicle modifications, historically does not fund electric wheelchairs.

Helpful Hints:
BCMH is part of the Maternal and Child Health Department of the Health Department of Ohio. The usual way families become involved with BCMH is through the hospital providing services. Families may also contact their local health department or BCMH directly. All diagnostic and treatment services must be through an approved provider.

Ohio Department of Education
Division of Special Education
933 High Street
Worthington, OH 43085-4087

For information contact:
Local School District
Special Education Coordinator

Description:
State law requires local educational agencies to provide appropriate educational programs for all identified handicapped pupils from age five (5) to twenty-one (21). Public Law 99-457, Section 619 has required that a plan be developed for serving three- to five-year-old identified handicapped children in the 91-92 school year.

Eligibility Criteria:
Any handicapped child who has been placed in special education programs in accordance with relevant federal and state regulations is eligible to benefit from funding. Each student must have an IEP (Individual Education Program). There are other specifics and financial guidelines to meet in the approved requirements. State categories are: Hearing Handicapped, Visually Handicapped, Orthopedically Handicapped, Other Health Handicapped, Severe Behavior Handicapped, Developmentally Handicapped, and Specific Learning Disabled.

Principal Disabilities Served

☐ ALS
☐ Amputation
☐ Blind
☐ Cerebral Palsy
☐ Deaf
☐ Mental Retardation
☐ Multiple Sclerosis
☐ Muscular Dystrophy
☐ Musculo-Skeletal Injury
☐ Other Neuromuscular Diseases
☐ Spina Bifida
☐ Spinal Cord Injury
☐ Traumatic Head Injury
☐ Other
☒ All of the Above

Principal Technology Services Funded

☐ Information
☐ Referral
☒ Assessment
☐ Recommendations
☐ Ordering
☒ Fitting
☐ Fabrication
☒ Evaluation
☒ Training
☐ Maintenance/Repair
☐ Follow-Up
☒ Equipment (see below)
☐ Other

Primary Areas of Equipment Funded

☐ Aids for Daily Living
☒ Augmentative Communication
☒ Computer Applications
☐ Environmental Control Systems
☐ Home/Worksite Modifications
☐ Prosthetics and Orthotics
☒ Seating and Positioning
☒ Aids for Vision/Hearing Impaired
☒ Mobility Aids
☐ Vehicle Modifications
☐ Other

Services and/or Equipment Typically Not Funded:
This Office is responsible only for providing funding to school systems through state and federal sources. Request for funding must be educationally relevant and necessary for a student to implement his or her IEP.

Helpful Hints:
A child must be classified as a Special Education Student before he or she is eligible to benefit from education of the handicapped funding. An IEP must be written that recommends technology services and/or equipment that is educationally relevant. All equipment becomes school district property. Contact the District Coordinator of Special Education in your local school district for more specific information.

(See Integrating Technology into a Student's IEP in the Appendix.)

Ohio Department of Mental Retardation/Developmental Disabilities
Family Resources Services Program
1821 Summit Road, #G30
Cincinnati, OH 45237

For information contact:
FRSP Coordinator
513/821-2128

Description:
Family Resources Services Program is a program aimed at assisting families who care for a family member who has mental retardation or a substantial developmental disability in their home. The program promotes the unity of the family by reimbursing them for all or part of the expenditures incurred in meeting the special needs of a person with mental retardation or other substantial developmental disability, expenditures that would promote self-sufficiency and normalization or prevent or reduce inappropriate institutionalization. Services provided on a sliding fee scale basis.

Eligibility Criteria:
A family is eligible for the Family Resources Program if a family member has mental retardation or other developmental disability, the family member with mental retardation or other developmental disability resides in the home and is in need of habilitation services, the family resides in the county in which reimbursement is sought and the individuals in the home comprise a family as defined by the program. There is a Family Resources Services Program in each county.

Principal Disabilities Served

- ☐ ALS
- ☐ Amputation
- ☐ Blind
- ☐ Cerebral Palsy
- ☐ Deaf
- ■ Mental Retardation
- ☐ Multiple Sclerosis
- ☐ Muscular Dystrophy
- ☐ Musculo-Skeletal Injury
- ☐ Other Neuromuscular Diseases
- ☐ Spina Bifida
- ☐ Spinal Cord Injury
- ☐ Traumatic Head Injury
- ■ Other (DD)
- ☐ All of the Above

Principal Technology Services Funded

- ☐ Information
- ☐ Referral
- ☐ Assessment
- ☐ Recommendations
- ☐ Ordering
- ☐ Fitting
- ☐ Fabrication
- ☐ Evaluation
- ■ Training
- ☐ Maintenance/Repair
- ☐ Follow-Up
- ■ Equipment (see below)
- ■ Other

Primary Areas of Equipment Funded

- ■ Aids for Daily Living
- ■ Augmentative Communication
- ☐ Computer Applications
- ■ Environmental Control Systems
- ■ Home/Worksite Modifications
- ■ Prosthetics and Orthotics
- ■ Seating and Positioning
- ■ Aids for Vision/Hearing Impaired
- ■ Wheelchairs/Mobility Aids
- ■ Vehicle Modifications
- ☐ Other

Services and/or Equipment Typically Not Funded:
Microcomputers which are not part of a communication device, or direct services to the handicapped family member.

Helpful Hints:
Families initial contact should be to the local County Board. Services are provided through approved providers.

Ohio Medicaid
Department of Human Services
317 E. 7th Street
Cincinnati, OH 45202

For information contact:
Rosemary Walton
614/466-8545

Description:
The Medicaid program is designed to provide quality health care to persons of low income defined as categorically and medically needy. The Medicaid program is sometimes called Title XIX because it is authorized by Title XIX of the Social Security Act. The Department of Human Services is designated as the single state agency to administer the program. The county offices of the Welfare Department determine eligibility for Medicaid.

Eligibility Criteria:
A disabled person who receives SSI or Social Security payments, Aid to Dependent Children, is eligible for the Healthy Start Program. Anyone who is legally blind or over 65 and meets financial eligibility is eligible for Medicaid. In addition, anyone eligible for general assistance or certain waiver programs is also eligible for Medicaid.

Principal Disabilities Served

- ☐ ALS
- ☐ Amputation
- ☐ Blind
- ☐ Cerebral Palsy
- ☐ Deaf
- ☐ Mental Retardation
- ☐ Multiple Sclerosis
- ☐ Muscular Dystrophy
- ☐ Musculo-Skeletal Injury
- ☐ Other Neuromuscular Diseases
- ☐ Spina Bifida
- ☐ Spinal Cord Injury
- ☐ Traumatic Head Injury
- ☐ Other
- ■ All of the Above

Principal Technology Services Funded

- ■ Information
- ■ Referral
- ■ Assessment
- ■ Recommendations
- ☐ Ordering
- ☐ Fitting
- ■ Fabrication
- ■ Evaluation
- ■ Training
- ■ Maintenance/Repair
- ☐ Follow-Up
- ■ Equipment (see below)
- ☐ Other

Primary Areas of Equipment Funded

- ■ Aids for Daily Living
- ☐ Augmentative Communication
- ☐ Computer Applications
- ☐ Environmental Control Systems
- ☐ Home/Worksite Modifications
- ■ Prosthetics and Orthotics
- ☐ Seating and Positioning
- ■ Aids for Vision/Hearing Impaired
- ■ Wheelchairs/Mobility Aids
- ☐ Vehicle Modifications
- ■ Other

Services and/or Equipment Typically Not Funded:

Helpful Hints:
Durable medical equipment and services must be for use by the individual in their residence, must be medically necessary, and must have been prescribed by a physician. Product literature and letters of support can help the application. The equipment must be reasonable and necessary for diagnosis or treatment of an illness or injury or improve the function of a malformed body member. Orthotic appliances are those items employed for correction or prevention of skeletal deformities. Prosthetic devices replace all or part of the function of a permanently inoperative or malfunctioning body organ. The individual's illness or injury must be considered in resolving coverage issues in each case. The Omnibus Budget Reconciliation Act also adds "other health care needs". Historically this has not included communication devices or computers, but they are *not* specifically excluded either.

Ohio Medicare
Social Security Administration
550 Main Street
Cincinnati, OH 45202

For information contact:
1-800-234-5772

Description:
Medicare is a hospital and medical insurance program administered by the Social Security Administration for covered persons who are either 65 years of age or older, or who are (at any age) blind, totally and permanently disabled, and have been receiving Social Security disability payments for 24 months, or have end-stage renal disease.

Eligibility Criteria:
Medicare has two parts: Part A (Hospital Insurance) pays the expenses of an individual in a hospital, skilled nursing facility or at home when receiving services provided by a home health agency. Part B (Medical Insurance) helps pay for physician services, outpatient hospital services, medical services and supplies, outpatient physical therapy and other health care services. Many Medicare recipients are also eligible for Medicaid benefits. Medicaid pays the Part B insurance premiums plus the coinsurance and deductible amounts and other charges sponsored by Medicaid but not covered by Medicare. In cases of crossover, Medicare regulations apply.

Principal Disabilities Served

- ☐ ALS
- ☐ Amputation
- ☐ Blind
- ☐ Cerebral Palsy
- ☐ Deaf
- ☐ Mental Retardation
- ☐ Multiple Sclerosis
- ☐ Muscular Dystrophy
- ☐ Musculo-Skeletal Injury
- ☐ Other Neuromuscular Diseases
- ☐ Spina Bifida
- ☐ Spinal Cord Injury
- ☐ Traumatic Head Injury
- ☐ Other
- ■ All of the Above

Principal Technology Services Funded

- ☐ Information
- ☐ Referral
- ☐ Assessment
- ☐ Recommendations
- ☐ Ordering
- ☐ Fitting
- ☐ Fabrication
- ☐ Evaluation
- ☐ Training
- ☐ Maintenance/Repair
- ☐ Follow-Up
- ■ Equipment (see below)
- ☐ Other

Primary Areas of Equipment Funded

- ☐ Aids for Daily Living
- ☐ Augmentative Communication
- ☐ Computer Applications
- ☐ Environmental Control Systems
- ☐ Home/Worksite Modifications
- ■ Prosthetics and Orthotics
- ■ Seating and Positioning
- ☐ Aids for Vision/Hearing Impaired
- ■ Wheelchairs/Mobility Aids
- ☐ Vehicle Modifications
- ☐ Other

Services and/or Equipment Typically Not Funded:
Bathroom and toileting aids; vehicle modifications.

Helpful Hints:
Medicare limits payments to certain "covered services" deemed medically necessary based on Medicare regulations. Durable medical equipment and services must be for use by the individual in their residence, must be medically necessary, and must have been prescribed by a physician. The equipment must be reasonable and necessary for diagnosis or treatment of an illness or injury or improve the function of a malformed body member. The publication "Durable Medical Equipment-Screening List, Medicare Coverage Issues Manual HCFA-Pub 6" should be requested. If equipment is rented under Medicare, the dealer will monitor the equipment and provide service during the rental period.

Private Health Insurance Companies
Contact your individual insurance agent or group coverage representative.

For information contact:
Your agent, personnel benefits manager, or case manager (ask if your company uses case management).

Description:
Private insurance companies fund certain types of equipment, depending on the terms of the policy and the specific medical condition involved. Most policies fund durable medical equipment such as wheelchairs, braces, etc.

Eligibility Criteria:
Rehabilitation services are not specifically addressed in most policies, therefore each policy will differ. Some policies do not cover "pre-existing" conditions, but do cover accidental injuries or conditions which manifested after coverage began. Policies which cover only the hospital stay will usually fund devices if prescribed by a physician when the individual is in the hospital. Unless the policy specifically states that it will not pay for a specific aid or device, the individual should file a claim. If the equipment is necessary but does not fall within guidelines of the policy, the individual can ask to revise the policy or make exceptions to the rule. All denied claims should be resubmitted and appealed.

Principal Disabilities Served

- ☐ ALS
- ☐ Amputation
- ☐ Blind
- ☐ Cerebral Palsy
- ☐ Deaf
- ☐ Mental Retardation
- ☐ Multiple Sclerosis
- ☐ Muscular Dystrophy
- ☐ Musculo-Skeletal Injury
- ☐ Other Neuromuscular Diseases
- ☐ Spina Bifida
- ☐ Spinal Cord Injury
- ☐ Traumatic Head Injury
- ☐ Other
- ☒ All of the Above

Principal Technology Services Funded

- ☐ Information
- ☐ Referral
- ☐ Assessment
- ☐ Recommendations
- ☐ Ordering
- ☐ Fitting
- ☐ Fabrication
- ☐ Evaluation
- ☐ Training
- ☐ Maintenance/Repair
- ☐ Follow-Up
- ☒ Equipment (see below)
- ☐ Other

Primary Areas of Equipment Funded

- ☒ Aids for Daily Living
- ☐ Augmentative Communication
- ☐ Computer Applications
- ☐ Environmental Control Systems
- ☐ Home/Worksite Modifications
- ☒ Prosthetics and Orthotics
- ☒ Seating and Positioning
- ☐ Aids for Vision/Hearing Impaired
- ☒ Wheelchairs/Mobility Aids
- ☐ Vehicle Modifications
- ☐ Other

Services and/or Equipment Typically Not Funded:
Hearing aids, corrective lenses.

Helpful Hints:
Insurance companies should be approached before seeking out other sources of funding, even if chances are slim. Other funding sources may require a rejection from the insurance company. When submitting a request for insurance payment of equipment, the nature of the request may determine the outcome of the decision. Determinations are based on need, prognosis, diagnosis, and type of equipment. Information should include length of time the device will be used, projected improvement in quality of life, and increased independence. Terminology in the written recommendation is an important factor; for example, the wording "prescription as treatment of..." or "for problems resulting from..." the specific diagnosis or injury can be helpful. The recommendation should include brand names, model, price, product literature, and supporting letters from associated health professionals. (From the PAM Repeater, No. 42, September 1987.)

Ohio Rehabilitation Services Commission
Vocational Rehabilitation Department
Enquirer Bldg., Suite 925
617 Vine Street
Cincinnati, OH 45202

For information contact:
513/852-3223

Description:
The 1986 Amendments to the 1973 Rehabilitation Act authorizes the provision of rehabilitation engineering/technology services to eligible individuals receiving vocational rehabilitation services.

Eligibility Criteria:
There must be a determination of a disabling condition (not visual impairment) and the handicapping condition must pose a significant obstacle to vocational/independent living functions and there must be a reasonable expectation that the services can assist the person to achieve gainful employment or function significantly more independently in the community.

Principal Disabilities Served

- ☐ ALS
- ☐ Amputation
- ☐ Blind
- ☐ Cerebral Palsy
- ☐ Deaf
- ☐ Mental Retardation
- ☐ Multiple Sclerosis
- ☐ Muscular Dystrophy
- ☐ Musculo-Skeletal Injury
- ☐ Other Neuromuscular Diseases
- ☐ Spina Bifida
- ☐ Spinal Cord Injury
- ☐ Traumatic Head Injury
- ☐ Other
- ■ All of the Above

Principal Technology Services Funded

- ■ Information
- ■ Referral
- ■ Assessment
- ■ Recommendations
- ■ Ordering
- ■ Fitting
- ■ Fabrication
- ■ Evaluation
- ■ Training
- ☐ Maintenance/Repair
- ☐ Follow-Up
- ■ Equipment (see below)
- ☐ Other

Primary Areas of Equipment Funded

- ■ Aids for Daily Living
- ■ Augmentative Communication
- ■ Computer Applications
- ■ Environmental Control Systems
- ■ Home/Worksite Modifications
- ■ Prosthetics and Orthotics
- ■ Seating and Positioning
- ■ Aids for Vision/Hearing Impaired
- ■ Wheelchairs/Mobility Aids
- ■ Vehicle Modifications
- ☐ Other

Services and/or Equipment Typically Not Funded:
Each case is evaluated on an individual basis.

Helpful Hints:
An individual should first contact their local VR area office. A counselor has to evaluate the individual and declare the individual eligible for VR services prior to completing an IWRP (Individualized Written Rehabilitation Program) recommending rehabilitation engineering services. These services include home accessibility, job modification, and health maintenance. Job modifications are expected to be cost-shared with the employer. VR uses an economy needs test in determining all case service expenditures. VR also administers Independent Living funds which, in some cases, can be used to purchase equipment.

To begin the process, write to the bureau including name, address, phone number, and disabling condition. This office serves Hamilton, Butler, Clinton, Clermont, and Warren counties. They can refer you to the appropriate office if you are outside these counties. Due to lack of monies, a person may be eligible for services, but not receive services because of a current directive to serve the severely disabled. In the Cincinnati area, Independent Living Options works with BSVI to provide Title 7, Part A monies for communication devices, computers, etc., BSVI eligibility is necessary.

Independent Living Services
Enquirer Bldg., Suite 905
617 Vine Street
Cincinnati, OH 45202

For information contact:
Gary Johnson, Liaison
513/852-3223

Principal Disabilities Served

☐ ALS
☐ Amputation
☐ Blind
☐ Cerebral Palsy
☐ Deaf
☐ Mental Retardation
☐ Multiple Sclerosis
☐ Muscular Dystrophy
☐ Musculo-Skeletal Injury
☐ Other Neuromuscular Diseases
☐ Spina Bifida
☐ Spinal Cord Injury
☐ Traumatic Head Injury
☐ Other
■ All of the Above

Principal Technology Services Funded

■ Information
■ Referral
■ Assessment
■ Recommendations
■ Ordering
■ Fitting
■ Fabrication
■ Evaluation
■ Training
☐ Maintenance/Repair
■ Follow-Up
■ Equipment (see below)
☐ Other

Primary Areas of Equipment Funded

■ Aids for Daily Living
■ Augmentative Communication
■ Computer Applications
■ Environmental Control Systems
■ Home/Worksite Modifications
■ Prosthetics and Orthotics
■ Seating and Positioning
■ Aids for Vision/Hearing Impaired
■ Wheelchairs/Mobility Aids
■ Vehicle Modifications
☐ Other

Ohio Rehabilitation Services Commission
Bureau of Services for the Visually Impaired
Enquirer Bldg., Suite 905
617 Vine Street
Cincinnati, OH 45202

For information contact:
513/852-3223

Description:
The 1986 Amendments to the 1973 Rehabilitation Act authorizes the provision of rehabilitation engineering/technology services to eligible individuals receiving vocational rehabilitation services.

Eligibility Criteria:
There must be a determination of a visual impairment which is the primary handicap. The handicapping conditions must pose a significant obstacle to vocational/independent living function, and there must be a reasonable expectation that the services can assist the person to achieve gainful employment or function significantly more independently in the community.

Principal Disabilities Served

☐ ALS
☐ Amputation
■ Blind
☐ Cerebral Palsy
☐ Deaf
☐ Mental Retardation
☐ Multiple Sclerosis
☐ Muscular Dystrophy
☐ Musculo-Skeletal Injury
☐ Other Neuromuscular Diseases
☐ Spina Bifida
☐ Spinal Cord Injury
☐ Traumatic Head Injury
☐ Other
☐ All of the Above

Principal Technology Services Funded

■ Information
■ Referral
■ Assessment
■ Recommendations
■ Ordering
■ Fitting
■ Fabrication
■ Evaluation
■ Training
☐ Maintenance/Repair
☐ Follow-Up
■ Equipment (see below)
☐ Other

Primary Areas of Equipment Funded

■ Aids for Daily Living
■ Augmentative Communication
■ Computer Applications
☐ Environmental Control Systems
■ Home/Worksite Modifications
■ Prosthetics and Orthotics
■ Seating and Positioning
■ Aids for Vision Impaired
■ Wheelchairs/Mobility Aids
■ Vehicle Modifications
☐ Other

Services and/or Equipment Typically Not Funded:
Each case is evaluated on an individual basis.

Source: SpeciaLink (1990). *Alternative and Assistive Funding of Alternative and Assistive Technology in Ohio: A Guide.*

USEFUL STRATEGIES WHEN APPLYING FOR FUNDING

1. Develop an understanding of the primary funding source and its relationship to other potential sources.
2. Maintain regular contact with the potential source. Direct calls and letters to the same person.
3. Communicate in writing whenever possible. Maintain a log of all contacts and information.
4. Review all policies and try your best to fully understand the policies and guidelines of the potential funding source.
5. Learn to use the language of the source. Provide substantial documentation from multiple sources of your need.
6. When questioned, try to educate and inform, emphasizing the long-term benefits to both the client and the source.
7. Provide all necessary documentation and be ready to appeal your request if denied.
8. Move on to secondary source(s) when efforts fail to bring success within appropriate timelines.

SUPPORTIVE DOCUMENTS FOR FUNDING REQUESTS

Physician's prescription

Letter of necessity from
- physician
- speech/language pathologist
- physical therapist
- occupational therapist
- teacher
- parents
- nurse
- rehabilitation counselor
- rehabilitation engineer

Insurance claim form

Photograph of the individual

General discussion of medical diagnosis

Literature describing the requested devices with specifications as they pertain to the individual

Explanation of the individual's functional skills without the equipment and how improved with the technology

Augmentative communication evaluation results including documentation that current methods are not sufficient for communication

Documentation of sources for additional support

OUTLINES FOR LETTERS OF MEDICAL NECESSITY

Physician's letter:

1. Medical History and Diagnosis
2. Prognosis
   a. Overall
   b. For speech
3. Degree of difficulty physician has in communicating with client
   a. Specific examples
4. Prescribed communication device or 'speech prosthesis'
   a. Why appropriate for medical purposes?
5. Additional supportive comments
   a. If the physician has seen the client use the device, comments regarding the client's effectiveness with the device should be included.

Speech Language Pathologist's letter:

1. Medical History and Diagnosis
2. Attempts at achieving verbal communication
   a. How long has client been in therapy
   b. Methods used to encourage verbal communication
3. Prognosis for speech
4. Client's present means of communication
   a. Why it is inappropriate/insufficient for medical purposes
5. Alternatives to present means of communication which have been investigated
   a. What they are
   b. Why they are not appropriate
6. Prescribed device
   a. Why more appropriate than above
7. Detailed description of client's trial period with prescribed device, if applicable.

A possible sentence for inclusion in the Speech/Language Pathologist's letter is:

> "Following extensive evaluation with this client, it is my professional opinion that the Touch (Light) Talker with Minspeak is the least expensive device which will adequately serve the communication needs of (client)."

Occupational Therapist's and Physical Therapist's letters

1. Medical History and Diagnosis
2. Length of treatment
3. How does lack of verbal communication hinder therapy?
4. Document (if applicable) client's inability to use manual communication
5. How would verbal communication allow client to receive maximum benefit from therapy?
6. Additional supportive comments:
   a. If the therapist has seen the client use the device, comments about the client's effective use of the device should be included.

Parent's letter:

1. Medical History and Diagnosis
2. Prognosis for speech
3. Describe specific medical situations in which your child's medical needs were not attended to within reasonable amounts of time due to communication barriers between the client and primary care givers (parents, physician, nurses, etc.).

(*See Medical Necessity sheet for more ideas.)

Teacher's letter:

1. Medical history and diagnosis
2. Length of time you have provided services
3. Describe specific situations, if appropriate, in which the client was ill or not feeling well and how this was handled within your classroom. Many teachers have reported incidents in which the client was ill and they interpreted it as "the client was having a bad day."
4. How would verbal communication allow this client to receive more timely medical care?
5. Additional supportive comments:
   a. If you have seen the client using the above device, comments regarding its effectiveness should be included.
   b. Provide comments regarding the client's ability to physically access the device.

SAMPLE

The Child Health Center
88 MAIN STREET / NORWAY MAINE 04268 / (207) 743-7034

December 4, 1987

To Whom It May Concern

Re: (d.o.b.)

Dear Sirs:

I am writing in my role as the personal physician for , now 4½ years old. has been a patient of mine since his birth. His medical diagnoses include severe spastic quadraparesis secondary to perinatal asphyxia. I am writing at this time to express my strong support for his obtaining an augmentive communication device. 's severe cerebral palsy makes it impossible for him to communicate through normal vocalization, and this will continue to be the case in the future. Obviously, there are many reasons why he needs to have some way to communicate with the outside world. There is ample evidence that he possesses the cognitive abilities to communicate but because of the cerebral palsy lacks the physical ability to talk. From a medical point of view, it is exceedingly difficult to manage him without any way to have direct communication with him. He has no way that he can communicate a report of his symptoms or concerns, and that hampers my ability to manage him medically. Because of his severe neurologic problems, he is at some medical risk for sudden problems, and I am fearful that without any means of communication that these problems could not be recognized in a timely fashion. Furthermore, those working with to improve his physical functions, such as physical therapists, are not able to work at maximal benefit because of the communication limitations.

In sum, the modern medical management of severe cerebral palsy is generally considered to include augmentative communication assistance as an integral part of a program. I strongly urge that funding of such a device be covered under his insurance policy for the above-noted reasons. If you have any questions please feel free to contact me.

Sincerely,

Stephen F. Bauer, M.D.

SFB:rm

Androscoggin Home Health Services Inc.
79 Main Street, P.O. Box 400
Auburn, Maine 04210
(207) 784-9304
Toll Free 1-800-482-7412

Main Street
rmington, Maine 04938
lephone 778-3523

Winter Street
orway, Maine 04268
lephone 743-7301

1 Knox Street
umford, Maine 04276
lephone 364-2723

SAMPLE

November 30, 1987

RE:
DOB:

Dear Sirs:

is a four year nine month old boy who has athetoid cerebral palsy with severe spasticity involving all four extremities. He is non-verbal and unable to communicate his medical and emotional needs.

I have worked with for the past three years in the home environment; speech and language therapy has emphasized developing a method to help express his basic needs. is limited in his expression due to his lack of verbalizations. Initially,he was taught to communicate his needs via eye gaze; however, this limited him to objects and places in his immediate environment. His pointing skills have improved in the past few months; therefore, his nonverbal expressive vocabulary has increased but is limited to the few pictures that he is able to point to on his tray.

The Touch Talker is the most effective speech prosthesis for He was evaluated at Maine Medical Center, Portland, Maine on 02/06/87 and this instrument was recommended as "the most efficient encoded symbol system." Subsequently, the Touch Talker was rented from Prentke Romich Inc. for a two-week period to determine whether or not this system was appropriate for He easily learned the encoded symbol system and the smiles and laughs that he expressed revealed an understanding that at last he was beginning to establish some independence in his environment. He seemed delighted by the synthesized speech that he was able to activate by pointing to a specific symbol. Since he is incapable of physiologically producing speech, this was the first time that he was able to elicit meaningful verbalizations. He was able to express to his parents when he was hungry or thirsty. Instead of crying, and the parents having to guess what was upsetting their son, he was able to express in a meaningful way what it was that he wanted or needed. cried when The Touch Talker was taken away from him and he was told that it had to be returned.

receptive language abilities and cognition are close to or at chronological age level. His problem, specific to speech and language needs, is his lack of meaningful expressive language skills. understands what he feels but is unable to express his physical and emotional needs.

(Con'd)

"A United Way Agency"

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This has caused extreme frustration evidenced by temper tantrums, crying, and whining. Several times during our therapy sessions right hand would become caught underneath his lap tray. At first a look of pain would appear on face. If I was unable to guess the cause he would then start to cry since the pain was most likely increasing. would then start screaming until finally, after a process of elimination, I was able to determine the cause of his pain. With The Touch Talker he would be able to immediately express the problem without increased pain or stress.

Due to lack of verbal expression potty-training has been unsuccessful. He has been unable to communicate when he has to go or has already gone in his diapers. His crying indicated discomfort but, again, this problem could not be solved until his parents or therapist were able to determine the cause. Once again, due to lack of verbal communication, his was unable to express his discomfort or distress.

therapeutic team not only feels that The Touch Talker is the most efficient speech prosthesis for him but, since it is one that will grow with through various programming methods as his medical and emotional needs expand, another electronic communicator devise would not be required. Therefore, the insurance company would not be requested to fund another speech prosthesis as he grows emotionally.

Thank you for your consideration of The Touch Talker and helping become an independent person with the ability to express medical and emotional needs.

Lynne Williams Garrow, MACCC SLP

Lynne Williams Garrow
MA CCC-SLP

LWG/ddw

S-T11

MEDICAL PROGRAMS

Private Payment

Private Health Insurance

Federal/State Health Care Programs

- Medicaid
- Medicare
- Bureau for Children with Medical Handicaps

STATE AND GOVERNMENT AGENCIES

Ohio Rehabilitation Services Commission

Bureau of Services for Visually Impaired

Ohio Department of Mental Retardation/Developmental Disabilities

Ohio Department of Education, Division of Special Education

Ohio Department of Human Services, Bureau of Medicaid Policy

Governor's Office of Advocacy

Ohio Department of Education, Division of Early Childhood

TRUST FUNDS, FOUNDATIONS, AND CORPORATIONS

NONPROFIT AND SERVICE GROUPS

Kiwanis

Rotary

Telephone Pioneers

Lions

Quota Club

Sertoma

United Cerebral Palsy

Easter Seal Society

Muscular Dystrophy Association

Churches/Synagogues

United Way

March of Dimes

S-T15

FUNDRAISERS

WISH MAKERS

Percy Ross
Sunshine Foundation
Make-a-Wish Foundation

PUBLIC APPEAL

FUNDING STEPS

- Obtain a technology evaluation for your child
- Locate a funding advocate
- Start with primary funding sources
- Gather supportive materials
- Document all originals, steps, and contacts
- Submit your request — use appropriate jargon
- Set time limit
- Appeal if necessary
- Be patient!!

Source: Preschool Integration Through Technology Systems, (PITTS), United Cerebral Palsy Association of Western New York, Inc., 4635 Union Rd., Buffalo, NY 14225; US DOE Grant #H024E80010

FUNDING

Recent data have shown that the most critical component of the funding process is the FUNDING ADVOCATE. The funding advocate can be a family member, case manager, educator, friend, or anyone who is willing to invest time in procuring funding for an individual's assistive device. Persistence and dedication are important qualities for the funding advocate as the process can be lengthy. Guidance from a resource person who is familiar with the funding process is extremely helpful and can be located by contacting your local medical or educational agency or the manufacturer or sales representative for the system/device.

The first source of funding to explore is Medical Coverage. This category would include private payment, private health insurance, and federal/state health care programs (Medicaid, Medicare, or the Bureau of Medical Handicaps). Requests based on medically-related needs should reference speech prosthesis and inability to communicate critical medical information. An appeal process generally follows if a denial for prior approval occurs. Clarification of information or additional information may be needed for the appeal. A resource person familiar with the funding process would be helpful in providing suggestions throughout this procedure. As of this date, Medicare has funded few communication devices. Organizations are lobbying to make changes in the Medicaid regulations. At this time, long term care facility residents have a better chance to get funding through Medicaid than other applicants. Please refer to the resources listed on the last page of this section.

Funding through Educational Agencies, Schools, and Vocational Rehabilitation Programs can be researched if appropriate during the processing of the insurance claim. State/federal programs would include, but are not limited to, the following: State Department of Mental Retardation/Developmentally Disabled, Bureau for Children with Medical Handicaps, Rehabilitation Services Commission (BVR), Veteran's Administration, and Worker's Compensation. The school can be contacted for assistance with educationally related issues for individuals age birth through 22 living within their school district boundaries. Schools have purchased devices for students, but this does not provide for flexibility since it belongs to the school system and is often not available for their personal use. Schools may require that the device stay in the school and would prevent communication in other critical settings. If the child moves out of the district or graduates, the device must stay with the school system.

Trust funds, foundations, and private corporations would be next on the list to contact as a funding source. Some trust funds and foundations designate money for specific or general purposes with guidelines for application. Directories can be found in libraries. Banks often have foundations and have this information available in the trust division of the main bank office. Large, national foundations receive many requests for funding, although small, local foundations may not be utilized because people are not aware of their existence. Local businesses/private corporations can be another source of funding as the company can use the contribution as a tax write-off or for public relations to boost their image.

The next source to pursue would be Nonprofit Civic Organizations/Service Clubs such as Kiwanis, Rotary, Lions, etc. These clubs have often contributed to the purchase of equipment, although they often offer to match contributions from other sources. Service Organizations such as United Cerebral Palsy (UCP), Easter Seal Society, Muscular Dystrophy Association, etc. tend to provide services for groups of people rather than individuals, although some contributions have been made for individuals. These service organizations may also assist you in making some connections with other sources for funding. Local chapters can be found in your telephone directory.

Fundraisers are next on the list with groups willing to sponsor private or public fundraising activities such as dances, bake sales, candy/product sales, etc. Wishmakers are a few people and organizations across the country which grant wishes for people. Two major sources are Percy Ross, author of "The Millionaire" newspaper column that runs in papers across the country, and **The Sunshine Foundation** for children with chronic disabilities (4010 Levick Street, Philadelphia, PA 19135).

After all sources of funding have been exhausted, a public appeal may be attempted. The family may or may not want to be placed in this public forum with newspaper and television appeals as well as pictures and information in local establishments.

Remember, funding is always available with persistence and dedication by the funding advocate and a little help from those who have experienced the process.

Components of a Medically Based Request

Since a medical insurance request is typically the first step that individuals make in the funding process, the following guidelines are presented.

Review the insurance policy dealing with Durable Medical Equipment, Prosthetics, and Orthotics. Your requests can focus on the terminology that they use for approved equipment while steering away from terms which are stated as exclusions. Identify a contact person to whom all correspondence and questions should be directed.

Include the following materials: (More specific guidelines, sample letters and forms available from the listed resources)

1. Prescription from the physician
2. Letter of medical necessity from the physician
3. Letter of medical necessity from the speech/language pathologist
4. Insurance Claim form
5. Literature describing the requested device

Additional information that is optional but strongly recommended:

1. Letters of medical necessity from occupational therapist, physical therapist, nurse, parents
2. Photographs of the individual
3. Communication Prosthesis Payment review summary (1988 Specialized Product/ Equipment Council) completed by the physician and speech/language pathologist
4. AAC Evaluation (including documentation that other methods of communication are not sufficient for communication)

When requesting that medical insurance provide funding, the main purpose of the device must be qualified for the medical request. Medical necessity must be clearly defined for medical insurance payment the same as would a request for accessing educational information to a school or for gainful employment to a vocational rehabilitation program. Two key ingredients in the medical requests are inclusion of the idea of speech prosthesis or replacing the function of a malfunctioning body part and the necessity of nonspeaking persons to be able to communicate critical medical needs to their physicians and primary caregivers. (Some policies, however, exclude the term "prosthesis.") Personal anecdotes regarding the latter are often effective.

Follow-Up Services

After a device is obtained, successful communication is dependent upon training of the family and school or vocational staff and the individual. It is often assumed that the individual can immediately use his/her system efficiently. Experience has proven that the provision of initial training and support is a necessary component of the entire process. Intensive therapy services through a speech/language pathologist, specialized clinic or educational agency to get the individual familiar with his/her system and able to communicate should be considered when the initial funding is requested. The assessment team should be able to provide assistance with the initial support needed or refer to appropriate sources. Support by linking up with other consumers and their families has also proven to be beneficial.

Funding Resources

Audiocassette: *Reimbursement Strategies for Assistive Devices* (audio teleconference held on August 23, 1989).

Funding for Assistive Technology and Related Services: An Annotated Bibliography, Alexander Enders, March, 1989, Electronic Industries Foundation, Rehabilitation Engineering Center, 1901 Pennsylvania Avenue, N.W., Suite 700, Washington, DC 20006.

How To Obtain Funding for Argumentative Communication Devices, 2/89. Prenke Romich Co., 1022 Heyl Road, Wooster, OH 44691, 800/262-1990 is helpline (free; contains sample letters).

Steps to Funding Ohio Augmentative Communication Problem Solving Consortium, May 1991.

The Many Faces of Funding, Anna C. Hoffman, Phonic Ear, 250 Camino Alto, Mill Valley, CA 94941, 415/383-4000 (sample letters).

Source: *Cuyahoga County Augmentative Communication Directory*, 1990.

FUNDING DEVICES AND SERVICES IN AUGMENTATIVE AND ALTERNATIVE COMMUNICATION

Communication is the essence of human life. Article II, Section 1, USSAAC Bylaws

Personal achievement is closely tied to the ability to communicate. The best interests of the client are being served only when the client is provided with the augmentative and alternative communication (AAC) device and services that offer the *most effective* communication possible. Because of the significant effect on a person's life, *this is no place for compromises based on cost or convenience*.

Fortunately, experience has shown that no such compromises are necessary. When a client has a good advocate, the funding can always be found for the best devices and services available.

FUNDING ADVOCATE

An early task in the funding procurement process is to identify the funding advocate. The fact that funding for a communication device is being sought suggests that the user is unable to speak for himself. Therefore, until the time that the user has an effective system and the skills to use it, an advocate must represent the interests of the user in many matters. *Funding will not happen without a dedicated advocate.*

THE USER

Qualify the user. What is the main purpose for the device? Is it considered a medical necessity, a tool for further education, or a means of gainful employment? To approach a school with the argument of medical necessity or to approach Medicaid with the argument that it will interface with a computer will not serve you well.

FUNDING SOURCES

There are many sources of funding for AAC devices and services and it is important to approach them in the proper order. Either Medicaid/Insurance, the Schools, or the Vocational Rehabilitation agency should be tried first and all avenues within that source should be exhausted before trying one of the lower level options. Each source has its own procedures and policies. Before submitting an application for funding, familiarize yourself with them and do research to determine what has worked for others.

Funding for the Best is *Always* Available!

INSURANCE / MEDICAID

These are the sources to approach with a claim of medical necessity. A number of progressive insurance companies and state Medicaid programs already recognize communication aids as a medical necessity and fund them. There are still those, however, who have not yet responded to the opportunities available to people with disabilities as a result of new technologies. In some cases, it is because they have not been exposed to them. Use terms such as "speech prosthesis" which may position the device more familiarly. Bringing the user to the agency can be an effective means of educating them. Remember that denial is not an end point unless you let it be one. If you are denied, make it clear that you will appeal and eventually sue – *and then do It!* This has been done with success, ultimately changing the system in those areas and paving the way for future clients.

SCHOOLS

Without a means of communication, it is difficult to participate in a normal academic setting. For that reason, schools have been known to purchase devices. Remember, however, that the device then belongs to the school, not the user. This may require the student to leave the device at school after school hours, during the summer, and permanently, after graduation or when moving out of the school system.

VOCATIONAL REHABILITATION PROGRAMS

Since employment is becoming a realistic goal for many people with disabilities, vocational rehabilitation programs will often fund augmentative communication devices if the main obstacle for employment is communication. Because these are also state-run programs, the eligibility requirements vary from state to state. Contact your local vocational rehabilitation office, which should be listed in the white pages of the phone book under your state's name.

PRIVATE CORPORATIONS

The purchase of equipment for a local resident by a business benefits both the user and business. The business will realize a tax write-off for a charitable contribution and will receive positive public relations (if the recipient agrees to publicity). This approach may be most effective with a company that *needs* a boost in its image.

TRUST FUNDS

Many people put part of their estate into a trust fund for a specific purpose. There may be one to assist people with disabilities in a bank in your area. Banks don't usually advertise this information however. To determine whether there are any such funds in your area, contact the trust division of each bank. Another source of information about funds is *The Foundation Directory* which lists funds and foundations. It can be found in large libraries. The larger foundations, such as the Ford Foundation, are typically inundated with requests, however, while local funds may sit untouched for years.

SERVICE CLUBS

Local civic organizations such as Kiwanis, Rotary, and Lions Clubs have often contributed to the purchase of equipment. Since funds are usually limited, it is best to use them sparingly and to suggest a "matching funds" arrangement with another funding source.

FUNDRAISERS

Families often have affiliations with groups which may assist in a fundraising activity. Churches, co-workers, and other organizations (such as labor unions) have successfully raised funds by conducting raffles, bake sales, car washes, dinners, and other creative activities.

"WISHMAKERS"

There are a handful of individuals and organizations which grant wishes to people with specific needs. Two such organizations are listed below. Your local UCPA affiliate may have more information.

- Percy Ross author of "*The Millionaire*" newspaper column which runs in papers across the country. Send him your request in care of a paper that carries the column.
- The Sunshine Foundation grants wishes to children with chronic disabilities. An application must be completed and there is a maximum amount they will fund. Families should contact the Sunshine Foundation National Headquarters, 4010 Levick St., Philadelphia, PA 19135.

PUBLIC APPEALS

If other sources of funding have been exhausted, a public appeal is an option. This form of funding procurement is not suggested as a regular avenue because people tend to become jaded if exposed to too many. Also, the family is placed directly in the public eye which may be uncomfortable. It has proved to be a successful tactic in a number of cases, however.

Source: Prentke Romich Company, Wooster, Ohio

Consultant: Carol Cohen

BEST COPY AVAILABLE

FUNDING RESOURCES

American Speech-Language-Hearing Association
1801 Rockville Pike
Rockville, MD 20852
301/897-5700
800/638-8255 (Consumer Hotline)

Governor's Office of Advocacy for People with Disabilities
7th Floor
8 E. Long Street
Columbus, OH 43266-0400
614/466-9956 (voice TDD)
800/228-5405 (voice/fax)

North East Ohio Society for Augmentative and Alternative Communication
Mace Mentch
Health Hill Hospital
2201 Martin Luther King Drive
Cleveland, OH 44052
216/721-5400 ext. 260, 285

Ohio Department of Education
Division of Special Education
933 High Street
Worthington, OH 43085
614/466-2650

Ohio Resource Center for Low Incidence and Severely Handicapped
470 Glenmont Avenue
Columbus, OH 43214-3292
614/262-6131 (voice)
614/262-1070 (TDD/fax)
will provide Special Education Resource Center contacts

United States Society for Augmentative and Alternative Communication (USSAAC)
% Barkley Memorial Center
University of Nebraska
Lincoln, NE 68588
402/472-5463

Association for Retarded Citizens
360 S. Third Street
Suite 101
Columbus, OH 43215

Center for Special Education Technology
Council for Exceptional Children
1920 Association Drive
Reston, VA 22091-1589
800/873-8255
Selected readings: Funding Technology Products and Services

National Rehabilitation Information Center
8455 Colesville Road
Suite 935
Silver Spring, MD 20910
301/588-9284
several funding publications

Ohio Coalition for the Education of Handicapped Children
933 High Street
Suite 106
Worthington, OH 43085
614/431-1307

Ohio Legal Rights Services
8 E. Long Street
5th Floor
Columbus, OH 43266-0523 614/466-7264

Ohio Speech and Hearing Association
9331 S. Union Road
Miamisburg, OH 45342
800/866-6742

OHIO FUNDING AGENCIES AND RESOURCES

Easter Seal Society
2204 S. Hamilton Road
Columbus, OH 43232
614/868-9126

Make-A-Wish Foundation
2600 N. Central Avenue
Suite 936
Phoenix, AZ 85004
602/240-6600

Ohio Department of Health
Bureau for Children with Medical Handicaps
P.O. Box 1603
Columbus, OH 43266-0013

Ohio Department of Human Services
Division of Long Term Care
Bureau of Resident Services
Bureau of Community Services
Prior Authorization Coordinator
State Office Tower
33rd Floor
30 E. Broad Street
Columbus, OH 43266-0423
614/466-9243

Ohio Rehabilitation Services Commission
Bureau of Vocational Rehabilitation
Bureau of Services for the Visually Impaired
Independent Living
400 E. Campus View Boulevard
Columbus, OH 43232-4604
614/438-1200 (regional offices)
800/282-4536 (TDD)

Veteran's Administration
Benefits Information and Assistance
200 N. High Street
Room 309
Columbus, OH 43215
800/827-8272

Industrial Commission of Ohio
246 N. High Street
Columbus, OH 43266-0589
614/466-6136

Ohio Bureau of Workers' Compensation
30 W. Spring Street
Columbus, OH 43266-0581
614/466-1000 (regional offices)
800/282-9536

Ohio Department of Human Services
Benefits Administration
Bureau of Medicaid Policy
State Office Tower
30 E. Broad Street
31st Floor
Columbus, OH 43266-0423

Ohio Department of Mental Retardation/Developmental Disabilities
State Office Tower
30 E. Broad Street
10, 12, and 13th Floors
Columbus, OH 43266-0415
614/466-7508 (county MR/DD program or Family Resource Services Program)

Percy Ross
"Thanks a Million"
℅ Local Newspaper

Sunshine Foundation
4010 Levick Street
Philadelphia, PA 19135

United Cerebral Palsy of Ohio
P.O. Box 14780
Columbus, OH 43214

LEVEL: STAFF

GOAL: **#6** Gain practical information regarding obtaining funding for assistive technology devices and services.

COMPETENCY TYPE: SKILL

OBJECTIVE: Participants will recognize and discuss considerations of the funding process unique to preschool-aged children.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
1. Small group activity Split up into small groups. Ask small groups to brainstorm what special issues and concerns may arise within the funding process based on the unique needs of young children.		
2. Large group activity After 10 minutes, ask groups to report back, and record their ideas on a Flip Chart. Encourage discussion.	2. Flip Chart and markers	
3. Here are some points which you may wish to integrate into your discussion: – The critical importance of long-range planning in the selection of a device or system for a preschool-aged child. To what degree will the device allow for future growth across domains — cognitively, physically, linguistically, academically, socially? Will this device limit the child in any of these respects? If so, is it modifiable, or would another system be necessary? Would the rapid changes in technology likely require a future upgraded system?		

LEVEL: STAFF *(continued)*

GOAL: **#6** Gain practical information regarding obtaining funding for assistive technology devices and services.

COMPETENCY TYPE: SKILL *(continued)*

OBJECTIVE: Participants will recognize and discuss considerations of the funding process unique to preschool-aged children.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
– Recognition that some professionals and/or parents may not be wholly supportive of technological solutions for very young children. Some may feel that young children should have greater opportunity to "catch up" before large sums of money are invested and/or specific technological solutions are implemented. – Recognition of the fact that while funding for assistive technology is a relatively recent development, a history of obtaining funding for many newer types of assistive technology for preschoolers is hardly established. Private insurance may tend to deny for developmental reasons. Cases may have to be built upon arguments of "prevention intervention." Early vocational skills may also become a possible rationale. – If traditional systems do not prove fruitful for obtaining funding for preschool-aged children, it may prove necessary for group advocacy to lobby for new resources for this population.		

LEVEL: STAFF

GOAL: **#6** Gain practical information regarding obtaining funding for assistive technology devices and services.

COMPETENCY TYPE: VALUE/ATTITUDE

OBJECTIVE: Participants will appreciate that funding for the best *is* always available — the necessary ingredients are PATIENCE and PERSISTENCE.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
1. Small group activity Pass out case studies A and B to the group. After everyone has read them, split the group in half. Ask Group A to meet together for five minutes and generate a list of words or phrases which describe the advocate in Case A. Similarly, ask Group B to generate a list which describes the "advocate" in Case B.	1. Handout (S-H38) *Case Studies A/B*	
2. Large group activity After 5-10 minutes of group discussion, record the characteristics of Advocate A in a bright colored marker on the Flip Chart. The group will probably offer words like "patient," "dedicated," "unceasing," "informed," "well-connected," "persistent," etc. Record the characteristics of "advocate" B in black marker. You'll probably hear "doubting," "unorganized," "uninformed," etc. Remind participants that research has shown that the most critical determinant in the successful obtaining of funding is the presence of a strong advocate. Most literature cites two primary characteristics. Ask participants which two characteristics are most important. Point out that they are PATIENCE and PERSISTENCE.	2. Flip Chart, bright marker, black marker	
3. Large group activity Close with Transparency S-T17, *Funding for the best is always available.*	3. Transparency (S-T17) *Funding for the best is always available.*	

CASE A

Brian is a five year old with a progressive neurological disorder which severely affects his speech. At age three, his mother worked closely with school officials and a local clinic to secure an appropriate evaluation of his needs for an augmentative communication system. Mrs. S. talked with the specialist at the clinic and learned the names of two other parents who had success in securing funding for their children's devices through private medical insurance. The specialist also explained to Mrs. S. the need for supportive letters from multiple sources proving medical necessity for her medical insurance. Mrs. S. contacted the other parents and arranged to meet them and their children over the next weeks. During this period, she also scheduled an appointment with her insurance representative and received information regarding necessary steps for submitting her claim. Contact with the specialist at the AAC clinic resulted in her realization that she should also talk with Ohio Rehab Services and Medicaid to see if Brian might qualify for funding. She followed up by scheduling appointments and receiving claim information.

Visits with parents resulted in gaining many tips. She learned that making the claim more personal with the inclusion of photographs would increase her chances. With copies of letters from the others, she began to outline what information she needed included in letters from Brian's physician, speech therapist, occupational therapist, and preschool teacher. She scheduled appointments with each of them, and prepared materials for each meeting. At each, she asked for their support in specific ways. She explained carefully and clearly what information was needed in their respective letters of recommendation. Over the next three months, she was able to gather all supportive documentation, and submitted her claim. She called her contact person weekly with firm but positive reminders of the urgency of Brian's needs. Meanwhile, she submitted a Medicaid claim, using the same documentation.

When the refusal was received from private insurance, Mrs. S. was disappointed, but decided to contact the other parents again to see if their experience also included the need for appeal. Once again, Mrs. S. met with another parent and found out how to initiate a successful appeal. She learned that allowing the insurance representative to become more personally in touch with the child was often helpful. She invited the representative to visit Brian at his school, and when this was successful, she planned a time when Brian could accompany her on her regular visit to meet with the representative. At this visit, she provided a direct opportunity for the representative to see the large degree to which Brian was unable to communicate. Mrs. S. also asked the AAC Specialist to provide an ongoing observational log of Brian's inability to communicate his vital daily medical needs.

Mrs. S. asked the specialist to accompany her and Brian to the appeal hearing. The specialist provided oral and written testimony with video clips from his preschool setting. Additional documentation was also provided from his teacher and therapists.

After two more weeks, Mrs. S. and Brian learned that the request had been approved. Mrs. S. now works at the local AAC clinic as a parent-to-parent volunteer.

CASE B

Another child at Brian's school is Ben, a five year old with severe communication difficulties resulting from cerebral palsy. Ben's teacher asked his case manager, Ms. X if an augmentative communication system had ever been investigated for Ben. The caseworker shared the following information:

Almost two years before, Ms. X had been asked by her supervisor to coordinate funding pursual for a device that had been recommended by his teacher at that time. Ben's parents had asked for community donations, but had collected only $200. Ms. X had offered to help by sending letters to local organizations, but had gotten no replies. Ms. X said she also had called the parent's private insurance, and after no forms were sent for three months, she called and made another request for forms. Six months later, the parents mentioned at Ben's IEP meeting that they had completed and sent the forms. When the claim was denied, the letter had stated that the request did not seem to involve a medical need. The parents and Ms. X seemed to feel that they had "given it their best effort."

S-T17

Funding for the best *is* always available!

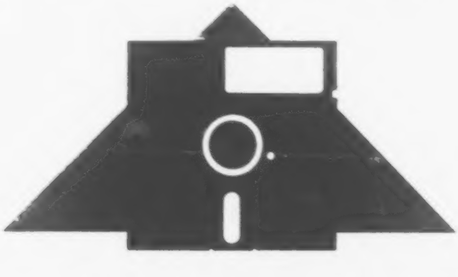
Funding success is 100% dependent upon the perseverance of the client advocate.

Prentke Romich Company

PROJECT PREPARE

Modules for Competency-Based
Personnel Preparation in
Early Childhood Education

Technology



Administrator

GOALS

1. Gain an overview of assistive technology and its integral role within curricular strategies for young children with disabilities.

2. Become familiar with switch application as a means of allowing young children with disabilities greater opportunity for independent control and participation.

3. Gain introduction to basic use of computer and peripherals with young children who have disabilities.

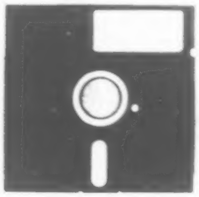
4. Explore how application of computers and peripherals can be successfully integrated within a curriculum for young children with special needs.

5. Gain an overview of augmentative/alternative communication (AAC) system as a means of meeting the needs of young children with severe communication difficulties.

6. Gain practical information regarding obtaining funding for assistive technology devices and services.

GOAL 1

Technology



LEVEL: ADMINISTRATOR

GOAL: **#1** Gain an overview of assistive technology and its integral role within curricular strategies for young children with disabilities.

COMPETENCY TYPE: KNOWLEDGE

OBJECTIVE: Participants will become familiar with several ways technology can impact the lives of young children with disabilities.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
1. Large group activity Distribute Handout (A-H1), *Preschool Children,* and point out the broad range of technology which is available to support the acquisition of early learning milestones.	1. Handout (A-H1) Tech Use Guide: *Preschool Children* (from CEC) Personal slides (if available)	1. Introduce the section by explaining that technology in today's world is used to enhance independence, and to increase social, play, and communication skills in young children. Leader should make mention of other devices that they have used with young children. Make sure that the wide range of technology is emphasized — both "low tech" and "high tech." In addition to the applications shown on slides, the leader may choose to mention items such as: – Muppet Learning Keys (early childhood keyboard for computer input) – Items children with visual impairment might utilize, such as Talking Books, Magnifiers, Beeper Ball (a ball with auditory signal; the child can hear it approaching), Braille printer (prints pictures with tactile feedback), Textured overlays for communication devices or Power Pad, etc.

LEVEL: ADMINISTRATOR *(continued)*

GOAL: **#1** Gain an overview of assistive technology and its integral role within curricular strategies for young children with disabilities.

COMPETENCY TYPE: KNOWLEDGE *(continued)*

OBJECTIVE: Participants will become familiar with several ways technology can impact the lives of young children with disabilities.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
		– Items children with hearing impairment might utilize, such as FM auditory systems, Echo Speech Synthesizer with headphones (adds auditory output for computer programs), use of an amplified classroom, etc. Personal slides that exemplify devices can be shown if available. Based on availability, leader can show or demonstrate additional items. Families may have concerns about some aspects of technology in modern life in general and/or in the specific context of education. These may be associated with cultural values and practices (e.g., religious). Encourage discussion of such issues.

PRESCHOOL CHILDREN

Babies and young children quickly learn that their daily interactions with the environment produce effects. Play is the child's way of learning. Looking, interacting, manipulating, crawling, toddling, and exploring are actions which begin early learning experiences. The sooner diversified experiences are introduced, the faster the child will learn to influence and control his or her environment.

Many children with disabilities are unable to interact with their environment. Thus, their development may be hindered. When early motor or intellectual experiences are restricted, delayed, or distorted, other lines of development are adversely affected as well. Lack of early experiences will affect later learning and socialization.

Young children with disabilities need early successful experiences in controlling their environment as do their peers without disabilities. Technology is one alternative which may provide successful opportunities when the child is unable to receive quality experiences through natural means. Many toys can be easily adapted so they can be controlled by a child who is severely physically disabled. Similar adaptations to a computer can provide access to a wide variety of computer-controlled environmental experiences for the very young child with disabilities.

Not only will technology benefit young children who are severely disabled, but will also augment the experiences and learning opportunities of children with mild disabilities. Computers can be used as a tool for learning other skills such as readiness concepts, visual motor coordination, and social skills. Children who use the computer at an early age will have the advantage of growing up with the technology and using it to their benefit throughout life. They stand to gain more and lose less through increased learning opportunities presented by the technology.

The Technology

A computer system for a young child should allow the use of alternative input devices and provide good color graphic output. Most young children are not ready for the standard computer keyboard thus alternatives should be available that easily connect to the basic computer system. These may include alternative keyboards, touch pads, pointing devices, and switches. Most programs for young children utilize color graphics, sound, and motion rather than written text so alternative output devices may be required. These may include a color monitor, voice synthesizer, or an environmental control unit.

Play

Within the natural play environment, many developmental opportunities are presented in unstructured ways. Toys and other objects are found to entertain, allow curiosity to develop, and provide opportunities for motor coordination and language development. For children with physical limitations who cannot independently participate in these unstructured play environments, the technology can help structure similar play opportunities that promote positive interactions. A simple example is using a battery operated toy equipped with a switch (such as a train or animal) to give control of play activity to the child. By activating the switch (e.g. pressing, touching, or rolling on top of it) the child can manipulate the toy. Infants as young as three months have "played" in computer-controlled environments to discover relationships between their actions and objects in their environment. These planned environments can also encourage motor development by positioning toys to encourage arm placement, pointing, and posture control.

As children grow older they love to play games. Preschoolers are just beginning to learn cooperative play. Computers offer unique opportunities to play games because they can direct turn taking and neutralize some of the motor skills needed to play. Consequently they can provide a recreational outlet for many nonverbal children and children with severe physical disabilities as well as their peers without disabilities. For example, a computer can simulate a board game. Using a switch or other alternative input device, the child activates the computer-generated spinner and moves to the next spun color or number space. Other examples include moving target games, matching exercises, and story boards.

Learning

During the early development years there is little differentiation between communication, language, and cognition. Early communication begins with intentional actions that gain someone's attention. The child with very severe disabilities may have no means to achieve this goal. Toys and buzzers activated by simple switches could be used for this early rudimentary communication task. A computer system can also be designed to assist with communication on this very early developmental level and can also be designed to assist on highly sophisticated levels, depending on the user's needs. This versatility makes the computer a viable option for communication devices — it can change with the changing communication needs of the user. For more infrmation about this topic request the Tech Use Guide on Augmentative Communication from the Center.

There are several ways the computer can be used to assist in the development of language skills. The computer can function as a beginning communication device and language acquisition aid. Some of the alternative keyboards have authoring programs that allow the board to be used as an alternative communication device or as a talking board that teaches and reinforces language concepts. Vocabulary with these programs can be changed in a matter of minutes.

Other programs are designed to teach higher level expressive and receptive language skills. Talking word processors which pronounce letters, numbers, words, phrases, and full text can be used to introduce language to students. In this application the computer becomes a tool for teaching reading and writing as well as language and communication.

In addition to language skills, computers can be used to teach independence. With a switch operated toy, a child can learn cause/effect relationships and choice selection and improve memory skills. These are just some of the basic skills needed to learn other skills later.

Motor and perceptual skill development are two other areas of learning in which the computer can assist the young child with disabilities. Visual-perceptual skills can be taught and reinforced through the use of simple game-like programs that use moving visual targets and timed motor responses to gain reinforcement. Another motor training application is the use of switches to promote postural changes or specific muscle movements. An example is placing a mercury switch on a child's head — when the child brings his or her head to an upright position, the tape player turns on reinforcing music.

Assessment

The computer can provide an opportunity to assess children at an earlier age. Alternative input devices allow the child to demonstrate cognitive abilities unhampered by delayed motor abilities. For example, with a touch sensitive screen, the child merely touches the computer screen to indicate a selection. Or a child can touch a picture which is placed on an alternative keyboard (e.g. Power Pad or Unicorn Board). By using these and other devices, the teacher can be more assured of assessing the target cognitive skill rather than the child's motor disability.

Access

For many preschoolers, including those with disabilities, the standard keyboard is not the best input method. Tiny hands often have a hard time pressing the small keys. Also, many preschoolers are nonreaders and have not mastered the alphabet, let alone the keyboard. Well designed software programs for young children overcome these barriers. Often preschool software programs only use a handful of keys. By highlighting the keys or blocking all others out, the child can become very successful with the task at hand. Stickers placed on important function keys (e.g. spacebar or return), keyguards, or a homemade mask which denotes only specific key area, are some helpful and easy solutions.

For children who need more than a minor modification, other alternatives include joysticks, game paddles, light pens, touch windows, a mouse, or expanded keyboard. These commonly available devices require specially written, but fairly common, software. Other specialty input devices such as switches, eyetrackers, and headpointers require special purchase and special programs. Many alternative keyboards require special software. Sometimes an adaptive firmware card will need to be installed in the computer before an alternative keyboard, switch, or scanning device can be used.

Selecting the appropriate device will depend on the specific needs of the child. For more information about this topic, request the Tech Use Guide on Computer Access from the Center.

Software

Before selecting any software program, determine the prerequisite skills needed to operate the program and the functioning level of the preschooler. These criteria are very important and should influence your decision. When teachers and parents first introduce a computer to a child, the goals should be to allow the child to use it as independently as possible, have a positive experience, feel in control, and be successful. Important features that software for preschoolers should possess include:

- **Clear, concise documentation.** The documentation or teacher's guide should be easy to read and informative.
- **Sound educational value.** Software should support the curriculum, reinforce correct answers, provide cues for incorrect answers, not provide rewards for incorrect answers (they should be ignored), and present a reading level that matches the child's ability.
- **Color, graphics, and sound.** Software should be colorful, interesting, animated, and enhanced with sound. Screens should be uncluttered, shapes easily recognizable, and if print appears on the screen it should be large enough for a preschooler to read. If a child is prone to seizures, avoid programs with flashing lights or graphics which may activate a seizure.
- **Adaptability.** The program should be modifiable. You should be able to change the level of difficulty, content, speed of presentation to fit the child.
- **Limited key input or alternative device usage.** Many preschoolers cannot use standard keyboard. As already mentioned the keys are too small, too close together, require too much pressure to activate, are too far from the child's reach, or are not in sequential order. Limiting key input to one or two keys is one solution, alternative devices are another.
- **Data collection.** If you are using the software for training or instruction, a management program is desirable. Information such as the number of correct responses, number of trials, or actual raw data will help you plan the child's program more effectively.

While you may think of other features that are important for the individual needs of your students, this guide will help you get started. Develop a list of features that are most important for your students. Narrow your selection to two or three programs. Review all programs before any are purchased.

GLOSSARY

Adaptive Firmware Card (AFC) — The AFC is a small circuit board that is placed inside the computer. A small external connector box, which comes with the AFC, is mounted on the side of the computer. Switching devices plug into this connector box. The AFC allows the computer to be accessed by any one of 16 input methods, depending on the physical ability of the user and the type of switch needed. Various input methods include: expanded keyboards, switches, morse code, and augmentative communication devices. The AFC also has several other features which are appropriate for use with young children. For example, one feature allows one to slow down the speed of the computer and thus slow down the action of an arcade-type computer game.

Alternative input device — Traditional or standard input to a computer is the keyboard. However, for many children with disabilities, standard input devices are a barrier to computer use. Non-traditional or alternative input devices have been designed to give the child a means to access the computer. These include expanded keyboards, switches, joysticks, touch windows or voice input.

Alternative keyboards — Touch sensitive boards which attach easily to the computer and bypass the standard keyboard as the input device are known as alternative keyboards. Some keyboards, through special programming, can change the definition and size of the keys to be altered by allowing several adjacent keys to act as one large key. Keyboards vary on the degree of pressure needed to activate the software.

Detachable keyboard — A keyboard that is not attached to the central processing unit (CPU) of the computer. A detachable keyboard usually attaches to the computer via a coiled cable much like that of a telephone cord. This keyboard can be placed just about any place the cord will reach (e.g., in a child's lap or on the floor).

Expanded keyboard — A large, oversized keyboard that replaces the traditional keyboard. Examples include the Muppet Learning Keys, the Power Pad, and the Unicorn Board.

Keyguard — A plastic or metal sheet with finger-size holes in it that correspond to the key locations of the keyboard. The keyguard is placed over the computer keyboard to help people with poor motor control select the right keys. Some have latching keys that allow the user to hold down two keys at once with only one finger or a headstick.

Mask — A device that is placed over a keyguard to block out extraneous keys and to place focus on a specific key area (e.g., return key). These are usually made out of cardboard and are noncommercial.

Membrane keyboard — A keyboard which is similar in function to a standard keyboard, but is generally more rugged and larger. The membrane protects the keyboard circuitry from moisture or spills. Some membrane keyboards are also programmable for added flexibility. Examples include the Muppet Learning Keys and the Power Pad.

Speech input — The ability of a microcomputer to recognize speech as a form of data input.

Speech output — A method of output that enables a computer to reproduce speech via a speech synthesizer.

Speech recognition — The technology of making a computer understand human speech, which makes it possible to transmit data or instructions to a computer with voice commands.

Speech synthesizer — A method of output that enables a computer to reproduce speech.

Switch — A device that allows alternative access to a computer or battery operated toys. The most common switches are push, lever, leaf, wrinkle, and sip and puff. Pressure against a switch turns it on while release of this pressure turns the switch off.

Touch sensitive — A touch sensitive device is a method of input which is activated by a light pressure of the hand or stylus.

READINGS

Burkhart, L. J. (1982). *More homemade battery devices for severely handicapped children with suggested activities.* College Park, MD: Author. Available from L. J. Burkhart, 8503 Rhode Island Avenue, College Park, MD 20740.

Burkhart, L. J. (1987). *Using computers and speech synthesis to facilitate communicative interaction with young and/or severely handicapped children.* College Park, MD: Author. Available from L. J. Burkhart, 8503 Rhode Island Avenue, College Park, MD 20740.

Morris, K. J. (1989). Alternative computer access methods for young handicapped children. *Closing the Gap,* 7(6), 1-15.

Pressman, H. (1987). *Making an exceptional difference: Enhancing the impact of microcomputer technology on children with disabilities.* Boston, MA: Exceptional Parent.

Rauschert, M. & Schneider, C. (1988). The use of robots in the preschool handicapped classroom. *Closing the Gap,* 7(4), 24-25.

Robinson, L. & Rauschert, M. (1988). Computer technology as a tool for preschool handicapped children. *Closing the Gap,* 7(4), 26-29.

Wright, C. & Nomura M. (1985). *From toys to computers: Access for the physically disabled child.* San Jose, CA: Author.

PERIODICALS

Closing the Gap, P.O. Box 68, Henderson, MN 56044.

Exceptional Parent, 1170 Commonwealth Avenue, Third Floor, Boston, MA 02134.

Journal of Early Intervention, The Division for Early Childhood, The Council for Exceptional Children, 1920 Association Drive, Reston, VA 22091.

Teaching Exceptional Children, The Council for Exceptional Children, 1920 Association Drive, Reston, VA 22091.

Topics in Early Childhood Special Education, PRO-ED, 5341 Industrial Oaks Boulevard, Austin, TX 78735-8809.

SOFTWARE RESOURCE LIST

Alphabet Circus, DLM Teaching Resources, One DLM Park, Allen, TX 75002, 800-527-4747.

Early Games for Young Children, Springboard Software, Inc., 7807 Creekridge Circle, Minneapolis, MN 55435, 612-944-3912.

Keytalk, Peal Software, Inc., 2210 Wilshire Boulevard, Suite 806, Santa Monica, CA 90403, 213-451-0997.

Language Development Series, Scott, Foresman & Company, 1900 East Lake Avenue, Glenview, IL 60025, 312-273-5900.

Reading Readiness: Visual Discrimination, EMC Publishing, 300 York Avenue, St. Paul, MN 55101, 800-328-1452.

ALTERNATIVE INPUT SOFTWARE RESOURCE LIST

Alphabet with Tom and Andy, Dunamis, Inc., 3620 Highway 317, Suwanee, GA 30174, 800-828-2443.

Exploratory Play, Peal Software, Inc., 2210 Wilshire Boulevard, Suite 806, Santa Monica, CA 90403, 213-451-0997.

First Words, Laureate Learning Systems, Inc., 110 East Spring Street, Winooski, VT 05404, 802-655-4755.

Gertrude's Secrets, The Learning Company, 6493 Kaiser Drive, Fremont, CA 94555.

Keys to Success: Computer Keyboard Skills for Blind Children, Life Science Associates, 1 Fenimore Road, Bayport, NY 11705, 516-472-2111.

The New Talking Stickybear Alphabet, Optimum Resource, Inc., 10 Station Place, Norfolk, CT 06058, 800-327-1473.

SPEECH SYNTHESIZERS

Cybertalker, Cyberon Corporation, 1175 Wendy Road, Ann Arbor, MI 48103, 313-665-8512.

The Echo Family of Speech Synthesizers, Street Electronics Corporation, 1140 Mark Avenue, Carpinteria, CA 93013, 805-684-4593.

Personal Speech System, Votrax, Inc., 1394 Rankin Road, Troy, MI 48083-4074, 800-521-1350.

INPUT DEVICES

Muppet Learning Keys, Sunburst Communications, 39 Washington Avenue, Room EP, Pleasantville, NY 10570, 800-431-1934.

TouchWindow, Edmark Corporation, 14350 North East 21st Street, Bellevue, WA 98009-3903, 800-426-0856.

Unicorn Expanded Keyboard, Unicorn Engineering Company, 6201 Harwood Avenue, Oakland, CA 94618, 415-428-1626.

SWITCH MANUFACTURERS

CompuAbility Corporation, 40000 Grand River, Suite 109, Novi, MI 48375.

Don Johnston Developmental Equipment, P.O. Box 639, 1000 N. Rand Road, Bldg. 115, Wauconda, IL 60084-0639, 800-999-4660.

Prentke Romich Company, 1022 Heyl Road, Wooster, OH 44691, 216-262-1984.

Steven E. Kanor, Ph.D. Inc., 8 Main Street, Hastings-on-Hudson, NY 10706, 914-478-0960.

TASH (Technical Aids & Systems for the Handicapped, Inc.), 70 Gibson Drive, Unit 12, Markham, Ontario, Canada L3R 4C2, 416-475-2212.

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Additional **Tech Use Guides** on the following topics are available from the Center upon request:

Guide for Teachers
Guide for Parents
Technology for Work, Home, and Leisure
Computor Access
Selecting Software
Selecting Hardware
Learning Disabilities
Hearing Impairments
Physical Disabilities
Visual Impairments
Telecommunication Networks
Augmentation Communication

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LEVEL: ADMINISTRATOR

GOAL: **#1** Gain an overview of assistive technology and its integral role within curricular strategies for young children with disabilities.

COMPETENCY TYPE: SKILL

OBJECTIVE: Given a case study, participants will identify ways that technology could impact the life of a young child with a disability.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
1. Present the case study on Transparency A-T1. Ask the participants to plan appropriate applications of technology for this child. You may choose to use the following case study or adapt one based on the particular population served by the group. **Case Study:** Johnny is a four-year-old child with cerebral palsy and a mild developmental delay. He has weakness in his motor control and finger dexterity. He is not able to hold his crayons, and has a difficult time manipulating the toys in the classroom. Leader should attempt to elicit ideas from the group on possible use of technology. Suggested applications for discussion: – Adapted toys with switches – Use of coloring software on the computer (e.g. Electric Crayon) with some type of adapted access, if necessary. These might include use of a keyguard, switch, Power Pad, or Touch Window. – Use of software and speech synthesizer on the computer for language development. Examples might be Keytalk, Exploratory Play, or Sticky Bear Opposites.	1. Transparency (A-T1) *Case Study*	1. In exploring ideas elicited by group, integrate these important ideas within the discussion: – Emphasize the importance of a *transdisciplinary team approach* in planning technological applications. Discuss the unique perspective that each team member brings to the process (e.g., parent, teacher, speech/language therapist, OT, PT, other related service personnel). Highlight the critical role played by *family involvement.* – Emphasize the importance of using an approach which *integrates the technological application within the normal curricular activities.* – Have participants plan specific applications of technology which would *encourage development of play, socialization, communication, and independence.*

LEVEL: ADMINISTRATOR *(continued)*

GOAL: **#1** Gain an overview of assistive technology and its integral role within curricular strategies for young children with disabilities.

COMPETENCY TYPE: SKILL *(continued)*

OBJECTIVE: Given a case study, participants will identify ways that technology could impact the life of a young child with a disability.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
– If Johnny is in a wheelchair, modifications may need to be considered to ensure access to his physical environment. To illustrate the team approach and the importance of family involvement within this case study, the following points might be made: – Johnny's speech/language therapist can contribute valuable suggestions for his vocabulary development with software application. – The O.T. and P.T. can ensure that he is seated properly at the computer to maximize the most efficient access. – The parent can provide Johnny's favorite toy to encourage high levels of motivation for learning to use a switch. To emphasize the need for integrating Johnny's technology within the class' normal curricular activities, points such as the following might be made: – Johnny is able to complete his art projects with the other students by using the drawing or coloring software. At other times, he is able to complete the regular class activities by using a special hand splint. – Johnny is able to participate in the group play time by using an adapted toy.		

LEVEL: ADMINISTRATOR *(continued)*

GOAL: **#1** Gain an overview of assistive technology and its integral role within curricular strategies for young children with disabilities.

COMPETENCY TYPE: SKILL *(continued)*

OBJECTIVE: Given a case study, participants will identify ways that technology could impact the life of a young child with a disability.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
2. Large group activity Leader may present Transparency A-T2, *General Principles for Applying Early Childhood Technology* and ask participants if their ideas have been in keeping with these general principles. Participants may discuss possible modifications to their original ideas.	2. Transparency (A-T2) *General Principles for Applying Early Childhood Technology*	

CASE STUDY

Johnny is a four-year-old child with cerebral palsy and a mild developmental delay. He has weakness in his motor control and finger dexterity. He is not able to hold his crayons, and has a difficult time manipulating the toys in his classroom.

GENERAL PRINCIPLES FOR APPLYING EARLY CHILDHOOD TECHNOLOGY

- Transdisciplinary team approach
- Active family involvement
- Integration of technology into regular curricular activities
- Applications encourage development of play, socialization, communication, and independent functioning.

LEVEL: ADMINISTRATOR

GOAL: **#1** Gain an overview of assistive technology and its integral role within curricular strategies for young children with disabilities.

COMPETENCY TYPE: VALUE/ATTITUDE

OBJECTIVE: Participants will explore methods of facilitating family involvement in the application of assistive technology.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
1. Large group activity Review requirements of P.L. 99-457 which state that "wherever appropriate and to the extent desired by parents, the preschooler's IEP will include instructions for parents." Ask participants how parental involvement specifically impacts on the process of implementing assistive technology.		
2. Large or small group activity Ask participants to name variables which typically influence the level of family involvement with technology. What social and/or cultural differences may possibly impact on a family's degree of involvement with technology? How can the transdisciplinary planning process best meet the child's needs while respecting family beliefs which may not place the same degree of importance in technology? Also: What determines an appropriate level of involvement? Is extensive involvement always the best? Are there cases where limited involvement may be appropriate?		2. Typical variables include: available time, perception of parental roles, acceptance of child's disability, daily living pressures, religious beliefs, perceived importance of technology, degree of "techno-phobia," and perhaps most important ... the strategies used by school personnel to encourage parental involvement. Social and/or cultural difference may result in varying degrees of: previous knowledge or experience with technology, "belief" or confidence in its impact, willingness to integrate within home environment, degree of financial backing or willingess/ability to serve as funding advocate.

LEVEL: ADMINISTRATOR *(continued)*

GOAL: **#1** Gain an overview of assistive technology and its integral role within curricular strategies for young children with disabilities.

COMPETENCY TYPE: VALUE/ATTITUDE *(continued)*

OBJECTIVE: Participants will explore methods of facilitating family involvement in the application of assistive technology.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
3. Present three levels of family involvement as conceptualized by the ACTT model: – Awareness of Technology Intervention – Assistance with Technology Intervention – Conducting Technology Intervention Ask participants for ideas on how parental involvement can be encouraged to increasing levels. Handout A-H1B, *Families and Technology* can serve as a reference and can be distributed to participants.	3. Transparency (A-T2B) *Three Levels of Family Involvement* Handout (A-H1B) *Families and Technology*	3. Be sure to include these general strategies within the group's discussion: *To faciliate Awareness Level:* Weekly or monthly newsletter, Awareness informal workshop, Parental meeting to explain technological intervenion(s). *To faciliate Assistance Level:* Scheduled classroom visits for parents. Model appropriate strategies with opportunities for participation in the classroom. *To facilitate Conducting Intervention Level:* Guided experiences for parents with clear written instructions and provision of all necessary materials. Praise all parental efforts, regardless of degree of success! Integrate intervention within home environment to greatest degree possible as appropriate for individual plan.

A-T2B

THREE LEVELS OF FAMILY PARTICIPATION WITH ASSISTIVE TECHNOLOGY

1. Awareness of Technological Intervention

2. Assistance with Intervention

3. Conducting Intervention

Source: Building ACTTive Futures, ACTT's Curriculum Guide for Young Children and Technology, College of Education, Western Illinois University, Macomb, IL 61455

FAMILIES AND TECHNOLOGY

Not only are parents* and extended family members the first and primary teachers of their children, they are children's life-long advocates. So if young children are to receive the benefits of technology experiences, families must be included in the entire effort, from the initial decision to explore the possibility of technology use for their children through the day-to-day experiences with equipment and decisions about software. Family members' suggestions enhance the likelihood that computer activities will be appropriate for a particular child. When a mother tells you, "He really likes music, but fuzzy textures seem to frighten him," she provides the information you need to determine appropriate initial software and choices for switches.

ACTT's family participation component reflects the emphasis on family involvement required in federal legislation. Public Law 99-457 states that "whenever appropriate and to the extent desired by parents, the preschooler's Individualized Education Plan (I.E.P.) will include instruction for parents." Technology workshops and parent meetings which meet parents' needs for computer information and skills are a part of ACTT programs. Part H of P.L. 99-457, which impacts handicapped infants and toddlers, directs that Individual Family Service Plans (IFSP) be developed. Including technology information and skills in the IFSP is both an important element for families of young children and easily "do-able" if staff members are ready to teach family members, using appropriate "adult learner" strategies.

Differences in Family Participation

Families require different levels of input into their children's programs, depending on daily living pressures, available time, perceptions of their role as parents, and a myriad of other factors (e.g., more mothers are now working because of economic necessity). On one hand, some parents may want the professional to make all the decisions and carry out activities since that is, according to the parents' perception, supposed to be the professional's role. These parents may want information but not participation. On the other hand, some parents wade right in, take major responsibility for all intervention activities, and make informed decisions about future directions for their children. Families' participation ranges on a continuum between the two.

Although it is beyond the scope of the **Building ACTTive Futures,** current literature on early intervention clearly defines family systems and the approaches families from various cultures deem acceptable. A clear understanding of family systems is necessary when decisions about technology applications are being made in an early intervention program.

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*The terms "parents," "family members," and "primary caregivers" are used interchangeably in this section.

When children are very young and/or severely disabled, the input and interest of families is more critical to the success of computer applications than it may be for the more mildly involved children in a preschool classroom. If parents or primary caregivers are not committed to the importance of technology applications for their children with severe disabilities, results are diluted. If a young child must use a communication program to indicate what s/he wants to eat, drink, or play with, using the same or a similar system at home as at school provides continuity, repeated practice, and a better chance of success. In this case, parents need to be directly involved with their child's program and knowledgeable about the equipment and software. On the other hand, direct participation of parents is not critical to the success of a mildly involved child who spends a morning in a preschool program learning about directionality by moving a Logo turtle through a maze.

Since technology is an exciting part of our world, family interest is usually high. Acquiring technology skills may very well provide a marketable new skill for mothers, fathers, grandparents, and other family members. Often the addition of technology to early intervention efforts results in a higher level of father interest and participation. Mothers, as well, are intrigued by the possibilities computers offer for themselves and for their children. Learning more about the potential and the effects of technology on children's developing skills and abilities is a high priority for most parents.

Levels of Family Participation in ACTT

Being "involved" does not necessarily mean that family members have to be present in the classroom. Parents can be involved in their child's program in many ways. Some parents choose passive involvement, demonstrating an awareness and support of their child's activities. Other parents may actively participate in computer activities, learning all they can about computer use for their child and themselves. And other parents may become active leaders, choosing to assist with activities in the classroom.

Because we recognize the differences in family participation, ACTT plans for three different levels of parent involvement:

1. awareness of aspects of technology intervention,
2. assisting with technology intervention, and
3. conducting technology interventions.

In one sense, the levels are sequential, from beginning to learn about technology applications to a growing sophistication in computer adaptations. However, the choice of level of participation will vary depending on family commitments. At all times family members decide upon their own level of participation. We believe that providing inviting opportunities for acquiring further computer skills promotes the potential for increasing involvement. We include activities for each level of involvement together with sections dealing with aspects of birth through three and severely disabled programs as well as preschool classrooms.

Source: Building ACTTive Futures, ACTT's Curriculum Guide for Young Children and Technology, Macomb Projects, College of Education, Western Illinois University, Macomb, IL 61455.

THREE TO FIVE
Parent Participation in Technology Activities

No matter the age or disabling condition of their children, levels of family involvement are similar. Those who work with the preschool population should refer to the previous sections for general philosophy and practices for working with parents.

Parents are more willing to participate in computer activities if they feel comfortable and competent at the computer. Competencies parents need to assist and conduct computer activities are listed in Figure 1. For a more detailed set of competencies for parent and staff training, refer to the "Competencies" chapter in this curriculum guide.

The adults should also know how to handle equipment properly. Knowing the correct names of the computer components (monitor, disk drive, keyboard, etc.) is useful. Computer terminology somewhat overwhelms people at first, but once they learn a few words and can speak the 'lingo,' it's not so frightening. Thorough knowledge of what to expect from a piece of software is important if an adult is going to conduct a computer session.

Information Level

Providing information about classroom computer availability and the intended use of computer activities in the curriculum are the first steps in involving families in educational computing. Two options for providing families with this information are a newsletter and a parent meeting.

A weekly or monthly newsletter sent to all families involved in the program is an excellent way to introduce the computer and computer activities. Read the section on Severe Disabilities for ideas on what such newsletters could contain. Throughout the school year, newsletters can inform parents about the new software being used, ways the computer helps children meet IEP goals, and future plans for classroom computer use.

A workshop or informal meeting effectively introduces families to the computer's role in their children's education. These meetings provide opportunities to demonstrate the types and attributes of software and peripherals and the ways children will be using the computer at school. Parents are encouraged to become acquainted with the computer, software, and peripherals through "hands-on" activities. Some parents may express particular interest in the computer and will want to learn more about their child's computer activities. Computers are good incentives for getting fathers involved.

In planning an awareness workshop, keep the atmosphere as informal and non-threatening as possible. The goal is to establish awareness of children's classroom activities and to provide opportunities for hands-on experience that may spark some interest and curiosity or alleviate fears about handling the computer. A relaxed friendly atmosphere will make parents comfortable in what may be a new experience and environment.

Assistance with Intervention

Once families know about their children's activities with the computer, they may want to see them using the computer. Parents who are able to come to the classroom may schedule a visit at a time when they can observe their child working individually and as part of a group. Such visits provide opportunities for the teacher to model computer teaching strategies for the parents and for the parents to provide feedback about their child's use of the program.

An after school or evening workshop enables family members who cannot visit the classroom during the day to observe their children at the computer. In addition, this workshop provides siblings the opportunities to observe and interact with each other in unique ways. A foundation for sibling sense of pride is created as the sibling with disabilities demonstrates skills at the computer.

If possible, have several computers available for the workshop and set up individual stations. Ideally, each family attending would have a computer, but if that is not possible, schedule specific times for each family to attend. During the workshop, the child can demonstrate computer skills to his/her parents. Family members soon begin to feel more familiar, and hopefully more comfortable, in interacting with their child at the computer. By modeling questions that encourage thinking skills (What would happen if ...), teachers encourage parents to ask such questions.

This level of involvement is often transitional. Some families will return to observe and ultimately participate in classroom computer sessions. If a parent is willing to assist in computer sessions, plan initial activities that parents can take part in comfortably. Because not all families are at the same level at a given time, schedule after school workshops on an on-going basis. Parents who are knowledgeable and willing may assist in organizing and presenting the workshops.

Conducting Computer Intervention

Results are almost always beneficial when parents work directly with their children. Parents provide ideas for making the intervention more enjoyable, challenging, and personal for their particular child. Parents who reach this stage of involvement see the computer as a valuable tool for helping their children gain new skills and reach IEP goals. With computer use, many goals are achieved that have seemed unattainable. Family members who share learning experiences with their children are rewarded by being part of this achievement.

Once adults are comfortable in assisting with computer activities, they may be ready to conduct a session with their child. As parents move to this level of involvement, they need opportunities to familiarize themselves with the computer and available software programs so they feel comfortable. Beginning activities should be kept simple to assure a successful experience. A teacher may help by

1. providing a clearly written explanation of the activity for review prior to the session,
2. posting directions near the computer to provide a convenient reference allowing for fewer questions and more independence, and
3. assembling all materials at the workstation prior to the intervention.

Some parents may be interested in developing their own computer activities for their child. The parent and the teacher should first discuss plans for implementation and their relevance to IEP goals. Once the parent has introduced and conducted the activity, s/he and the teacher need to discuss the effect of the activity, its success and/or failure. Parents are to be praised and thanked for their efforts, no matter what the degree of success.

At level three, it is assumed that parents possess a basic level of computer knowledge. Parent Competencies, listed in Figure 1, target those skills needed by parents to successfully plan and conduct computer intervention for their children. The following section will help teachers organize and conduct computer workshops to provide parents with the knowledge, skills, and confidence needed for them to become involved in the intervention program.

Source: Building ACTTive Futures, ACTT's Curriculum Guide for Young Children and Technology, Macomb Projects, College of Education, Western Illinois University, Macomb, IL 61455.

GOAL 2

Technology

LEVEL: ADMINISTRATOR

GOAL: **#2** Become familiar with switch application as a means of allowing young children with disabilities greater opportunity for independent control and participation.

COMPETENCY TYPE: KNOWLEDGE

OBJECTIVE: Participants will learn about types of switches and interfaces and why they are used.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
1. Large group activity The Switch a. Define switch b. Select one adapted battery operated toy and demonstrate switches with the toy. Identify and discuss each switch as it is introduced. c. Explain to participants that toys can be permanently adapted for switch use by vendors or by individuals, or can be temporarily adapted. Introduce another toy that has been permanently adapted and one that has been temporarily adapted. d. Discuss primary purposes and uses of switch application.	1. Handout (A-H2) *Commonly Used Switches* Handout (A-H3A and 3B) *Switches* *Switch Use* Various switches: Plate, Flat, Mercury, Leaf, or others (available from SERRC or ORCLISH) Switch Toys (available from SERRCs or ORCLISH) Battery Adaptor for temporarily adapted toy. **Supplemental Resources** PITTS Module, *Switch Use* (provided at conclusion of this module), contains additional information.	1. Recommend that participants use Handout A-H2, *Commonly Used Switches* to follow along as each switch is introduced. Leader can refer to enclosed *Switch Use* (from PITTS) and Handout A-H3, *Switches* for additional information on switch access. Explain that a switch is a device used to control an object (i.e., toy, appliance, computer) with a single movement. Children with physical or cognitive limitations are enabled to independently control objects in their environments and thus participate to greater degrees. Explain that switch activation needs to be a reliable, consistent muscle movement, such as press of a hand, turn of a head, or even a blink of the eye. Point out that information from a PT, OT, and parent can be very useful in assessing which muscle movement should be utilized.
2. Large group activity The Switch interface. a. Define switch interface. Depending on resources available: b. Demonstrate switch interface with timer and toy.	2. Handout (A-H4) *Switch Interfaces* Handout (A-H5) *Switch Ideas*	2. Recommend that participants use Handout G-H4, *Commonly Used Switch Interfaces* to follow along as each switch interface is introduced.

LEVEL: ADMINISTRATOR *(continued)*

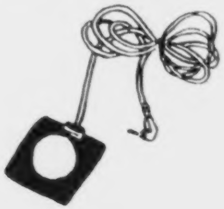
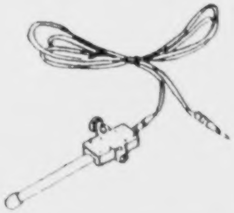
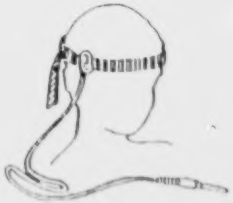
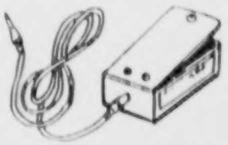
GOAL: **#2** Become familiar with switch application as a means of allowing young children with disabilities greater opportunity for independent control and participation.

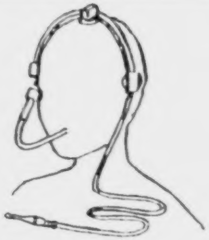
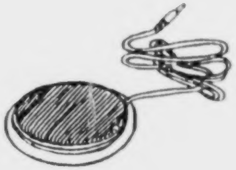
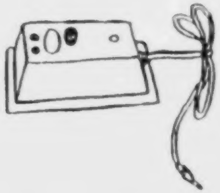
COMPETENCY TYPE: KNOWLEDGE *(continued)*

OBJECTIVE: Participants will learn about types of switches and interfaces and why they are used.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
c. Demonstrate switch interface with control unit and appliance. d. Demonstrate that switches can also be used to access an electronic communication board or computer.	Various switch interfaces, timer, control unit (available from SERRC or ORCLISH) Switch toys, common household appliances (tape recorder, fan, blender)	Explain that a switch interface is a connection between a toy, appliance, or computer and a switch. Interfaces can allow different options for a child. For example, switches interfaced with a timer allow toys or objects to stay on for a predetermined length of time. This may be important for children who do not have the necessary motor control or strength to sustain pressure on the switch.
3. Using examples from Handout A-H4, *Switch Ideas*, discuss how switch use not only allows a child to accomplish a given task, but also provides larger educational benefits, such as: a. Cause and effect as a foundation for learning. b. Environmental control can lead to further exploration. c. The use of switch activities as a motivator for learning and play, and the utilization of switch-activated play as a vehicle for further learning. d. Important developmental goals may be targeted through switch activities, such as: visual attention, imitation, following of directions, visual tracking, initiating and terminating interactions, and turn-taking.		Explain to participants that there are numerous single switch computer programs available for young children. Many are listed in the "Supplemental Resources" section of this leader module.

OVERVIEW OF COMMONLY USED SWITCHES

NAME	EXAMPLE	ACTIVATION	COMMENTS	VENDORS
Flat Switch		Small low force movement of arms, hands, legs, head, etc.	• flat size allows placement under many objects	Don Johnston TASH
Leaf Switch		Flexible switch that is activated when bent or pressed gently	• requires mounting • can improve head control, and fine motor skills	Don Johnston Kanor TASH
Mercury (Tilt) Switch		Gravity sensitive switch activates when tilted beyond a certain point	• can improve head or other posture control • attaches easily with velcro strap	HCTS Kanor TASH
Plate Switch		Downward pressure on plate by hand, foot, arm, leg, or other reliable movement	• most common • can be covered with different textures • some offer music, light, or vibration	Don Johnston Kanor TASH

NAME	EXAMPLE	ACTIVATION	COMMENTS	VENDORS
Sip 'n Puff		Sipping or puffing on tubing	• requires good head and mouth closure • can improve breath control • amount of air pressure adjustable	Kanor TASH
Switch 100 "Big Red"		Light touch anywhere on its top surface	• recommended for young children • click provides auditory feedback • diameter 5″	Ablenet
Voice Activated		Significant vocalizations (1 to 2 seconds)	• can improve vocalizations • has sound sensitivity control	Kanor

Source: Preschool Integration Through Technology Systems, (PITTS), United Cerebral Palsy Association of Western New York, Inc., 4635 Union Road, Buffalo, NY 14225; US DOE Grant #H024E80010.

SWITCHES

Why a Switch?

A switch is a simple device used to control input into a computer when a keyboard cannot be accessed. Switches are also used as alternative input mechanisms with modified battery-operated toys. Switches enable people with physical or cognitive limitations who cannot use a computer or device, such as a battery-operated toy, the ability to respond to environmental stimuli. Using a battery-operated toy activated by a switch allows even severely disabled children opportunities to control external events. Because they help children understand cause and effect, predictability, and normality, switches provide excellent preparation for future applications of environmental control and communication.

Switch Application and Learning Theory

Children who are otherwise unable to explore their environment can do so with the aid of a switch. Coupled with a computer software program, a switch is a mechanism for response enhancement. Cause and effect relationships can be developed using a software program such as **Switch 'N See** developed by Project ACTT. The child activates a switch, in lieu of a keyboard, to control the program. Battery-operated toys activated by a switch also allow a child the opportunity to control the environment. Once a child begins to realize that he can effect a change in his surroundings, his desire to explore the environment will be further stimulated. On a continuum, cause and effect development often sets the precedence for discriminatory learning. Likewise, when a developmentally disabled child understands the connection between the activation of a switch and a toy's movement, a foundation for independent learning is laid. A child's simple awareness of cause and effect provides a basis for all future learning.

Switches provide predictability and normality for children who cannot access certain devices due to physical or cognitive limitations. Predictability and stability of a child's environment fosters a child's self-satisfaction and autonomy, which is important in all areas of early developmental learning. Using switches with devices such as battery-operated toys gives a child the opportunity to experience normal play. Play encourages the development of social interaction.

Switch Selection

Because the needs and abilities of handicapped children are so diverse, matching the type of switch to the child is crucial for the child to successfully use it. Proper placement of the switch and positioning of the child are two important factors for optimal child response. The child's most reliable, comfortable, and stable body position must be assessed. The child's energies should be focused on operating the switch and responding to the stimuli, not on maintaining the "proper" body position.

After the most reliable body position is determined, the various types of switches can be evaluated. The tread, ribbon, pillow, and mercury switches are the most common switches with prices ranging from $5 to $200. The various types of switches discussed below can be customized to meet the needs of a particular child.

The Tread Switch: A tread switch is pressure operated. Pressure can be applied with the press of a finger, hand, head, or foot. When enough pressure or force is applied to the top of the switch, a connection will be made. As long as the pressure is applied, the circuit will remain completed and the connected device will continue to operate. When the pressure stops, the circuit will be broken and the connected device will be turned off. A tread switch can be made of durable materials such as wood and plexiglass and has a reinforcing clicking sound so the child knows when the switch has been pressed. Project ACTT disseminates a videotape and manual, *Constructing a Battery Interrupter and a Tread Switch,* that demonstrates how to make a simple, inexpensive tread switch.

The Pillow Switch: Another pressure activated switch is the pillow switch. This soft, sensitive switch can be activated by a slight press of a hand, finger, head, or foot. The cover on the pillow can be changed to add tactile or visual stimulus.

The Ribbon Switch: The ribbon switch is a long, flexible band that can be activated by a sweeping motion of the hand or a direct grasp, pull, or push against it. The ribbon switch can also be mounted in wood blocks to provide stability or can be covered with tactilely or visually stimulating materials.

The Mercury Switch: The mercury switch, a versatile switch that can be used with various types of body positions, is often attached to a headband or armband and is activated when mercury moves across contact wires in a capsule. When attached to a headband, the mercury switch can be designed to activate when it moves to the midline or to either side of the midline.

Encouraging independent learning is the goals of any switch activity. Independent learning can be enhanced using switches coupled with software programs and/or modified toys to foster the child's realization that he has impact on or control over his environment. Learning then becomes more enjoyable, and the child develops an eagerness to participate in learning activities. Most importantly, the child and his family realize that his disability need not prevent him from independently impacting his environment.

Source: Building ACTTive Futures, ACTT's Curriculum Guide for Young Children and Technology, Macomb Projects, College of Education, Western Illinois University, Macomb, IL 61455.

SWITCH USE

TOPIC: **SWITCH USE**

OVERVIEW: This module provides an overview of the use of switches by young children with handicaps. It demonstrates different types of switches and their use with battery-operated toys and environmental controls.

TIPS TO THE LEADER: This module can be conducted using any variety of switches. The main objective of the module is to show how all switches work to change or control an object. The handouts describe common switches and switch interfaces.

If participants are novices, you might want to allot more time for hands-on activities with switches. This could be a full morning workshop where participants learn to make and use switches.

REQUIRED SKILLS: None

OBJECTIVES:

1. To provide a purpose for using switches with young children
2. To name and operate different types of switches
3. To operate toys and appliances adapted for switch use
4. To name and operate different type of switch interfaces

MATERIALS: Hardware — for leader and each team:

- Various switches: Plate, flat, mercury, leaf, or others
- Switch toys
- Common household electrical appliances (i.e., blender)
- Various switch interfaces

Handout Packet H-12:

- H-12-1, Commonly Used Switches
- H-12-2, Switch Interfaces

KEY POINTS/ ACTIVITIES:

1. Purpose for using switches with young children

1a. Explain to the participants that switches are tools which increase a child's ability to actively participate in leisure, domestic, vocational, and community activities by controlling electrical toys and appliances with a single movement.

1b. The use of switches helps a child with handicaps participate in his world and control elements of his environment.

1c. When using a switch just like any other educational material, there should be a purpose for its use. For example, one purpose or goal for using a switch toy with a young child, would be to increase that child's attention span.

2. Different types of switches

H-12-1

2a. Distribute *Handout H-12-1, Commonly Used Switches* to each participant. Recommend that participants use this handout to follow along as each switch is introduced. The handout can also be used for note taking and future reference.

2b. Arrange several switches in front of participants. A switch is a device a child uses to control an electronic object. By activating any one of these switches, a child with physical handicaps can learn to control toys or objects in his environment. Any battery-adapted toy can be modified to work with a switch.

2c. Switches are activated by a controlled physical movement. This needs to be a reliable, consistent muscle movement such as the press of a hand, turn of the head or the blink of an eyelid. It is important to assess a child to find which is his most successful movement to make switch use successful.

2d. Select one adapted battery-operated toy and demonstrate the use of different switches with the toy. Identify and discuss each switch as it is introduced. Give the participants an opportunity to use the switches.

2e. Further information on the use of switches can be obtained from switch vendors or special projects (see Reference section).

3. Toys adapted for switch use

3a. Explain to the participants that toys can be permanently adapted for switch use by vendors or by individuals. Refer to the Reference section for more information.

3b. Introduce several toys that have been permanently adapted for switch use. Allow participants an opportunity to use each toy with several switches.

3c. Battery-operated toys can be adapted temporarily or permanently. Using a copper wafer connection, demonstrate a temporary adaptation of a toy for switch use.

4. Switch interfaces

H-12-2

4a. Distribute *Handout H-12-2, Switch Interfaces* to the participants, and explain that a switch interface is a connection between a toy or appliance to a switch. Interfaces can allow several different options for the child.

4b. For example, switches interfaced with a timer allow toys or appliances to stay on for a predetermined length of time once the switch is activated. This may be an important function for children who do not have the necessary motor control or strength to sustain pressure on the switch.

4c. An Environmental Control Unit allows electric devices to be activated by a switch. Common household appliances can be easily adapted for switch use. Any appliance that uses a plug can be used with a switch. Show and demonstrate the use of the Environmental Control Unit with an electrical appliance. Plug the appliance into the unit and plug a switch into the jack on the control unit. Demonstrate the use of the appliance with a switch.

4d. Allow participants an opportunity to operate the timer or Environmental Control Unit with several toys and appliances.

4e. Some switches can be used as input devices for computer programs. In addition, these same switches can be used as an input method to the computer allowing a child to control any software program.

CONCLUSION: This module introduces switches and switch interfaces. Participants are able to operate appliances and toys adapted for switch use.

REFERENCES:

Branderburg, S. A. & Vanderheiden, G. C. (Eds.). (1987). *Communication, control, and computer access for disabled and elderly individuals. Resource Book 2: Switches and environmental controls.* Boston, MA: College Hill Press.

Levin, J. & Scherfenberg, L. (1986) *Breaking Barriers*. Minneapolis, MN: ABLENET.

Levin, J. & Scherfenberg, L. (1987). *Selection and use of simple technology in home, school, work, and community settings.* Minneapolis, MN: ABLENET.

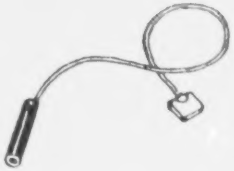
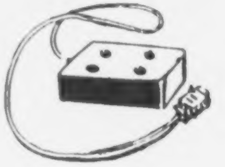
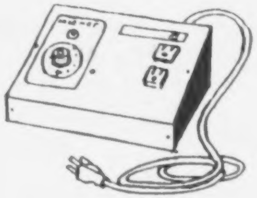
RESNA. (1982). *A guide to controls. Selection, mounting, application.* Washington, DC: Author.

R-12-1, Switch Vendors.

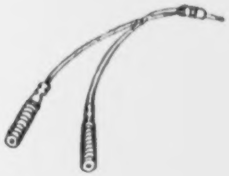
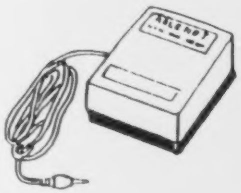
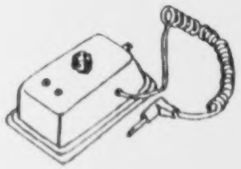
R-12-2, Resources for Adapting Battery Operated Toys.

Source: Preschool Integration Through Technology Systems, (PITTS), United Cerebral Palsy Association of Western New York, Inc., 4635 Union Road, Buffalo, NY 14225; US DOE Grant #H024E80010

OVERVIEW OF COMMONLY USED SWITCH INTERFACES

NAME	EXAMPLE	ACTION IT MODIFIES	COMMENTS	VENDORS
Battery Device Adaptor		Allows a battery operated device to be activated by switch	• non-permanent • can be used with most on/off toys, radios, and tape recorders	Ablenet Don Johnston Kanor
Computer Switch Interface		Allows single switch access to an Apple computer	• accepts 1 or 2 switches • substitutes switches for joysticks	Ablenet Don Johnston TASH
Control Unit		Enables electrical devices to be activated by a switch	• allows children to participate with peers • used with continuous closure or on/off • timer can be set 2 to 90 seconds	Ablenet Don Johnston TASH

Source: Preschool Integration Through Technology Systems, (PITTS), United Cerebral Palsy Association of Western New York, Inc., 4635 Union Rd., Buffalo, NY 14225; US DOE Grant #H024E80010

NAME	EXAMPLE	ACTION IT MODIFIES	COMMENTS	VENDORS
Series Adapter		Connects 2 switches and 1 toy. Both switches must be activated at the same time	• encourages bilateral movement • promotes cooperation between 2 children	Ablenet HCTS Kanor
Switch Latch Interface		Turns the device on and then off with each switch activation	• good for children who are unable to maintain switch closure for a length of time	Ablenet Don Johnston HCTS Kanor
Timer Module		When switch is closed, a toy is activated for a pre-set time	• depending on vendor, toy activates for 1 to 90 seconds	Ablenet HCTS Kanor

Adapted for use from the Technology/Learning/Collaboration Project, Grant #H024C8002288

SWITCH IDEAS

These ideas have been pulled from many different sources. In designing activities that involve switches you are limited only by your imagination. Be creative!

Hook Battery Device Timer (Ablenet) between the switch and the reinforcer. This way the battery-operated toy/tape recorder stays on for a set length of time. This allows a child who cannot sustain pressure on a switch to get reinforced for pushing the switch. This also gives a child more involvement and control over an activity since he/she needs to keep pressing the switch for the activity to continue. They aren't simply watching something that someone else turned on.

The child could use his/her switch and a tape recorder to start songs during music time. Record 15 seconds (or any set amount of time) of each song. Set the Battery Device Timer (if using battery-operated tape recorder) or switch control unit (if using tape recorder that plugs into box) to 15 seconds so that when the child pushes the switch the song starts and the rest of the class joins in. The child does not push the switch again until it is time to sing the next song.

Use the switch-operated drum so the child has an instrument during music time.

When the classroom is making a "band" let the child with the switch and tape recorder start the music and the other children can play along.

Use a switch control unit (Prentke Romich Company, Ablenet, etc.) so small AC appliances can be controlled by a switch. Need to make sure that voltage does not exceed the abilities of the control unit. Blender, blow dryer, radio, small TV, fan, light, tape recorder, mixer, popcorn popper, etc. can be used. Use your imagination! This will allow child to participate in age appropriate activities, help out around the home, help make snack, etc.

During snack time a switch control unit can be used so that the switch controls a blender, mixer, or other small appliance. Let every child in the room use the switch to take turns controlling the appliance.

Other ideas for small appliances and the switch control unit:

- Fan — blow the air at people, blow something up in the air, talk/sing into the fan, hold bubble wand in front of the fan to blow bubbles, tie colored streamers onto the fan
- Colored lights, Lite Brite, Light box, Christmas tree star
- Blow dryer — play game of blowing cotton balls/ping pong balls across the table, blow air at people, toy boats across water, pinwheels, target shoot
- Radio, small TV, small vacuum cleaner, almost any small appliance will work

Record directions for Simon Says on a tape. Make each direction be a set amount of time (such as five seconds). Set the switch timer for five seconds. Then when the child presses the switch a direction is given to the class.

Stories recorded on cassette tapes (either purchased or recorded by a family member) can be used for recreation/leisure.

Switch can be used to control a battery-operated Spin Art during art activities.
  Make spin art notecards
  Paint on leaves
  Put glue on paper and drop glitter or pieces of tissue paper while it is spinning

Use the Spin Art for a spinner for a game — put numbers or colors on an overlay and attach a pointer to the spin art. The child moves the number of spaces shown or to the color that was highlighted.

Some games which are battery-operated may be very appropriate to make switch operable such as Bed Bugs.

The child's teacher can record messages about the child's day for he/she to "tell" the family at home. Parents can record messages for the child to "tell" the teachers and children at school.

Child could press a switch to turn on a light or make a sound to signal the start of a race.

Use switch with a slide projector. Each switch press advances the carousel one picture. Could be used for recreation/leisure, to show slides for show and tell, for group learning activity, etc. Slide projector adaptor available through Ablenet.

Child can use the switch, Battery Device Timer, tape recorder, and an answering machine loop tape for communication. Record a message on the tape and put a picture corresponding to the message on/near the switch. Messages could be:

  "Come here" — to request attention
  "More please" — to request more food, actions, toys
  "Help"
  "I'm finished"
  "My turn"
  Anything appropriate to a situation

Think creatively about activities you can do with a toy rather than just letting the child sit there and watch the toy go:

Car/Truck	Drive into the garage (shoe box) Knock down a wall/tower of blocks Deliver or pick up small toys or snacks
Kitty	Walk to food Crawl under a blanket Kick the blanket off Walk off of the table
Crawling Baby	Crawl to bottle to eat, book to read, blanket to sleep, etc. Have a baby race with two crawling babies

Have two children with toys and switches. Let the toys "chase" each other.

For outdoor summer play get a battery/switch-operated squirt gun (Handicapped Children's Technological Service makes a squirt gun and an elephant that shoot water *30* feet).

At Halloween — create a switch-controlled haunted house. Children use switches, tape recorders, switch control units to control the lights, scary noises, and scary music.

For musical chairs allow the child using a switch to control the music.

Use toys appropriate to the unit or theme the class is working on so that the toys are related to ongoing activities.

Have the student use a switch and tape recorder to give the directions/explanation for an ongoing activity. (I know of a student who did this to describe the magic trick she was doing as part of the school magic show.)

Barrett School has developed a switch-operated bowling ramp. Barrett School is in Akron, Ohio.

Patti J. Place, M.A., CCC-SLP

Family Child Learning Center, Tallmadge, OH 633-2055

3/20/91

LEVEL: ADMINISTRATOR

GOAL: **#2** Become familiar with switch application as a means of allowing young children with disabilities greater opportunity for independent control and participation.

COMPETENCY TYPE: SKILL

OBJECTIVE: Participants will operate toys and appliances adapted for switch use and identify resources for these materials.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
1. Individual or small group activity Give participants the opportunity to use the various switches, switch interfaces, toys, and appliances.	1. Various switches: plate, flat, mercury, leaf, or others (available from SERRC or ORCLISH). Various switch interfaces (also available from SERRC or ORCLISH). Common household electrical appliances (tape recorder, fan, blender). Switch toys (permanently and temporarily adapted). If resources are available: Computers, switches, switch interfaces, and single-switch software.	1. If possible, obtain toy(s) that would be of greatest interest to young children, such as: – Plush Fancy Feet Caterpillar that walks, with eyes/antennae that light up. – Robot that walks with moving arms and eyes that light up. – Plush Pig that walks with sound and wagging tail. – Climbing Fireman.
2. Large group activity Provide Handout A-H6 listing sources for obtaining these materials.	2. Handout (A-H6) *Switch Resources*	2. This opportunity for participants to experience the increased opportunities created through switch activation will be *greatly* enhanced if you include at least one computer equipped with a switch, switch interface, and piece(s) of single-switch software.

SWITCH RESOURCES

Don Johnston Developmental Equipment, Inc.
P.O. Box 639
1000 N. Rand Road, Building 115
Wauconda, IL 60084
800/999-4660 or 708/526-2682

Zygo Industries
P.O. Box 1008
Portland, OR 97207
800/234-6006 or 503/297-1724

Linda Burkhart
8503 Rhode Island Avenue
College Park, MD 20740

ABLENET
1081 10th Avenue S.E.
Minneapolis, MN 55414
612/379-0956 or FAX 800/322-0956

ComputAbility Corporation
40000 Grand River, Suite 109
Novi, MI 48375
800/433-8872

Creative Switch Industries
P.O. Box 5256
Des Moines, IA 50306
514/287-5748

Tapeswitch Corporation
100 Schmitt Blvd.
Farmingdale, NY 11735
516/694-6312 or FAX 516/694-6304

Prentke Romich Company
1022 Heyl Road
Wooster, OH 44691
800/642-8255 or 216/262-1984
(Ohio residents call collect)

TASH, Inc.
70 Gibson Drive, Unit #12
Markham, Ontario L3R 4C2
Canada
416/475-2212 or Telex 06-986766 TOR

Asahel Engineering, Inc.
N.E. 820 California Street
Pullman, WA 99163
509/332-2205

Toys for Special Children, Inc.
(Steven Kanor)
385 Warburten Avenue
Hastings-on-Hudson, NY 10706
914/478-0960

Regenesis Development Corporation
1046 Deep Cove Road
North Vancouver, BC V7G 1S3
Canada
604/929-2414

Adaptive Equipment for the Handicapped
P.O. Box 496
Ocean Park, ME 04063-0496
207/934-2952

DU-It Control Systems Group, Inc.
8765 Twp. Rd 513
Shreve, OH 44676-9421
216/567-2906

Behavioral Engineering
230 Mt. Herman Road
Scotts Valley, CA 95066
408/438-5649

Adaptive Communication Systems, Inc.
Box 12440
Pittsburgh, PA 15231
412/264-2288

Arroyo & Associates, Inc.
2549 Rockville Center Parkway
Oceanside, NY 11572
516/763-1407

KY Enterprises/Custom Computer Solutions
3039 E. 2nd Street
Long Beach, CA 90803
213/433-5244

Technology for Language and Learning
P.O. Box 327
East Rockway, NY 11518-0327
516/625-4550

Luminaud Switches
8688 Tyler Blvd.
Mentor, OH 44060

Source: Building ACTTive Future, ACTT's Curriculum Guide for Young Children and Technology, Macomb Projects, College of Education, Western Illinois University, Macomb, IL 61455.

LEVEL: ADMINISTRATOR

GOAL: #2 Become familiar with switch application as a means of allowing young children with disabilities greater opportunity for independent control and participation.

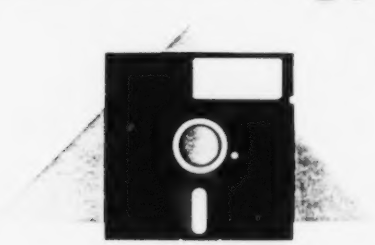
COMPETENCY TYPE: VALUE/ATTITUDE

OBJECTIVE: Participants will explore methods of using switch application to effectively integrate children with special needs within typical curricular activities.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
1. Large group activity Discuss how a typical preschool activity could be modified which would utilize switch application to accomplish full participation by all children. Ask participants for specific examples. Discuss advantages for both children with disabilities and children who are typically developing within examples given.	1. Handout (A-H5) *Switch Ideas* can be used as a resource for examples (from previous activity).	1. Be sure to emphasize the opportunity for peers to develop perception of children as equal partners and equal participants in classroom activities. Children with disabilities gain advantages of greater independence and control, heightened self-esteem, increased social opportunities, greater opportunities for language development, etc.

GOAL 3

Technology



LEVEL: ADMINISTRATOR

GOAL: **#3** Gain introduction to basic use of computer and peripherals with young children who have disabilities.

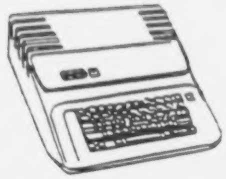
COMPETENCY TYPE: KNOWLEDGE

OBJECTIVE: Participants will learn that the computer and peripherals can be used in various ways to meet the individual needs of young children with special needs.

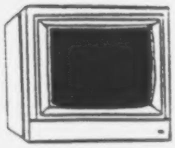
ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
1. Large group activity Using Handout A-H7, *The Computer System: Standard Components* as a reference, review the basic components of the computer system. If audience has little or no experience with Apple II computers, leader may review *briefly* general concepts covered in Leader Notes.	1. Handout (A-H7) *The Computer System: Standard Components* *Leader Notes (A-L1-6)* *Introduction to the Computer System* (training module from PITTS) *Glossary* (of Computer Terminology) *Computer Tips** *Starting Up a Software Program** *Caring for Disks** *The Adaptive Firmware Card*	1. For more in-depth general information on the computer, leader can refer to the Leader Notes. *These may be appropriate also as Handouts if audience does not have experience with Apple II computers.
2. Explain that it is the input of information by the standard keyboard that causes young children problems. Small hands have a hard time reaching and typing keys. Young children are usually nonreaders and nontypists which also makes the keyboard inappropriate. Young children with physical or cognitive limitations may display even stronger needs for an alternate means of input.		
3. Large group activity The video *Adapting the Computer* can be shown.	3. Video *Special Friends and Computers: Adapting the Computer* This video is from PITTS and will probably be available at your local SERRC.	3. Point out various peripherals as they are shown in the video. Ask participants to identify specific advantages that appear to provide young children in providing access to the computer.

A-H7

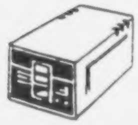
THE COMPUTER SYSTEM STANDARD COMPONENTS



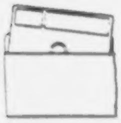
The **COMPUTER** is the processing unit, memory, and power supply source of the computer system. It is also referred to as the Central Processing Unit (CPU).



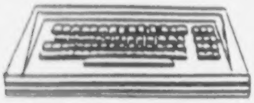
The **MONITOR** provides a visual display of the information being processed by the computer. The information can be words or pictures. Color monitors are suggested for use with preschoolers. The monitor attaches to the computer with a video cable. Unlike televisions, sound is not controlled through the monitor; it provides video output only.



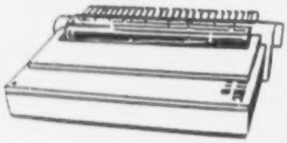
The **DISK DRIVE** is a device that reads the program information stored on a disk. After a disk is inserted and the power turned on, the disk drive loads the program into the computer's memory so that it can be used.



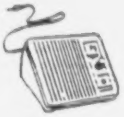
The **DISK** is a storage medium of programmed information. It is the software program that the computer reads and responds to.



The **KEYBOARD** is the standard input device similar to a typewriter, which sends information to the computer by typing letters, numbers or commands. Keyboards can be built into the computer console (Apple IIe) or attached to the computer with a cable (Apple IIGS).



The **PRINTER** is a device which produces paper or a "hard" copy of the information developed using the computer. Several preschool programs offer a color print-out option; a special printer and color ribbon is required. The printer connects to the computer through an interface card and cable.



The **ECHO SPEECH SYNTHESIZER*** is a device which connects to the computer with an interface card and cabled speaker. It provides speech output for programs specifically designed to work with the Echo.

*The Echo Speech Synthesizer is not a standard component of the computer system. However, it is highly recommended to be used with preschoolers, to enhance their software programs.

Source: Preschool Integration Through Technology Systems, (PITTS), United Cerebral Palsy Association of Western New York, Inc., 4635 Union Road, Buffalo, NY 14225; US DOE Grant #H024E80010.

INTRODUCTION TO THE COMPUTER SYSTEM

OVERVIEW:

This module provides an introduction to computers and related components. Specifically, participants learn to recognize standard input and output components of the computer and are introduced to alternate input devices and enhancements. Sections on care, maintenance, and efficient use of the computer system are included.

TIPS TO THE LEADER:

As this is a basic introduction to the computer, it can be used as a precursor to any of the following technology modules. It is designed for the novice. The length of time suggested for this module does not include time for participants to start up software independently. You may want to lengthen the module depending on the needs of your audience. If the majority of the participants are extensive computer users, this module may be introduced as a reference module. The booklet, found in Appendix B, provides the structure of the module and is entitled "An Introduction to the Computer System". This booklet is a great resource to utilize when training others. It should be distributed to all participants either novice or user level.

REQUIRED SKILLS:

None

OBJECTIVES:

1. To define components of the standard computer system
2. To define alternate input devices
3. To illustrate connector areas on the computer
4. To list methods to use in caring for disks
5. To demonstrate steps necessary to start up a software program
6. To list ways to care for the computer system
7. To list suggestions for tips on organization, software, and hardware use

MATERIALS:

Hardware — for leader:
- Apple IIe Computer system with color monitor and printer
- Echo IIb Speech Synthesizer
- Touch Window
- Power Pad
- Switch

Software — for leader:
- Preschool software program

Handout Packet H-6:
- (Appendix B)
- Booklet: An Introduction to the Computer System

KEY POINTS/ ACTIVITIES:

1. Standard computer components

1a. Point to the computer system and explain that the Preschool Integration Through Technology Systems (PITTS) Training centers around the use of Apple computers. These computers are recommended for several reasons:

- They are easy to adapt to the needs of young children with physical handicaps.
- The majority of preschool software is currently designed for Apple computers.
- Apple computers are the most frequently used computer model in the elementary school setting; a setting which these preschoolers will soon enter.

Appendix B

1b. Distribute booklet found in Appendix B, *An Introduction to the Computer System,* to the participants. Recommend that they use it for future reference. Explain and demonstrate that the booklet contains information on standard computer components and alternate input devices, along with other helpful information. The use of devices is explained in full during future modules. The purpose of this session is to provide a general overview of the computer.

1c. Using the computer system for demonstration, point out the various standard components and describe them by using the booklet information as a guide. The standard components include: the computer (the central processing unit), monitor, keyboard, disk drive, disk, and printer.

1d. Point out to the participants that the Echo Speech Synthesizer is not a standard part of the computer. It is an enhancement which is recommended as an integral component in computer use with young children with handicaps and their non-handicapped friends.

2. Alternate input devices

2a. Explain to the participants that it is the input of information by the standard keyboard that causes young children a problem. Small hands have a hard time reaching and typing keys. Plus, young children are often nonreaders and non-typists, which makes the keyboard an inappropriate choice for them. Fortunately, there are many ways to adapt the computer to make it easier.

2b. With two or three different devices available for demonstration, explain that these alternate input devices help to provide successful computer experiences for young children. The following devices, plus others, are described in the booklet.

- Touch Window: This device mounts onto the monitor. A child simply touches the screen to use the software program.
- Power Pad: The surface of this device changes with each piece of software. Show different overlays and explain that the press areas are defined for each program.

- Switch: This device is used by very young children and people with physical disabilities. A single press permits the user to run a software program.

2c. Remind the participants that all of the input methods shown in this module are discussed at length in separate modules.

3. Computer connection areas

3a. Explain to the participants that these input devices and computer enhancements, such as the Echo Speech Synthesizer, must be connected to the computer in some way. There are several ways to do this. This information is clearly illustrated in the booklet as part of each device description.

3b. Assemble the participants around a computer (CPU) to demonstrate the connector sites. Explain that there are two I/O (in/out) ports found on the Apple computer. Several devices plug into these ports.

3c. Turn the computer around and locate the 9 pin I/O port on the back of the computer. Explain that devices such as joysticks and the Touch Window connect here. Demonstrate the plug-in using one of the devices.

3d. Explain that another port is used for devices with 16 pin heads, such as the Power Pad or Koala Pad. This 16 pin I/O port is found inside the computer. Reassure the participants that this information is clearly illustrated in the booklet.

3e. Take the top off the computer. Locate the 16 pin I/O port on the upper right corner of the motherboard. Show a cable with a 16 pin head to the participants and explain that an extender port can be used so that you don't have to open the computer each time you want to use the Power Pad.

3f. With the computer open, point out other parts of the computer: the motherboard, power supply box, and the seven expansion slots.

3g. Explain that these expansion slots can be used for additional enhancements to the computer. A circuit card is placed in a slot so as to use the capabilities of the computer. Describe and demonstrate available cards and their functions or use the following as examples:

- For the printer to receive directions from the computer, a circuit card is added to slot one. A cable then connects the printer to the card.
- The Echo Speech Synthesizer is a circuit card and speaker system. The card is inserted into an expansion slot and the speaker box is attached to the card with a cable.
- Other cards can be used for extending the memory of the computer, modem use in transferring information over telephone lines, or adding other input devices that do not plug into one of the ports (light pens, mouse, etc.).

3h. Replace the top of the computer. Tell the participants that they will have the opportunity to plug in devices and install circuit cards during other modules.

4. Caring for disks

4a. Demonstrate a disk to the participants. Remind them that the disk is what provides the versatility to the computer. Information that the computer will use is stored on the disk. Point out the shiny film and explain that the information (data) is stored on the surface of this magnetically coated film. A vinyl covering called a "jacket" protects the film.

4b. Suggest that the participants find the section in the booklet entitled "Caring for Disks." Discuss each point. Field any questions.

5. Starting up a software program

5a. With the participants seated in front of the computer system, explain that steps necessary to start up a software program will be demonstrated. This is a review for individuals who have used software prior to this training.

- Make sure the computer is off.
- Remove the disk from the paper envelope by holding the label end.
- Slowly insert the disk into the disk drive and close the door.
- Turn on the computer, either by turning on the computer and monitor separately, or by activating the switch on the surge protector.

5b. Explain that this process is also know as "booting" a disk.

6. Caring for the computer system

6a. Explain that the computer system is a rugged machine that should provide years of service. Careful use and regular maintenance can extend the life of any machine.

6b. Instruct the participants to find the section in the booklet entitled "Caring for the Computer System". Review and discuss each point. Ask participants for other suggestions. Field any questions.

7. Helpful hints

7a. Explain that there are several additional pieces of information to know when using computers. The "hints" listed in the booklet under "Computer Tips" are grouped under three categories and are the result of a survey of a variety of computer users. The three categories include: organization, software, and hardware.

7b. Instruct the participants to locate the section in the booklet. Discuss each point, and ask the participants for other suggestions. Field any questions.

CONCLUSION: This module provides an overview of the computer system. The Apple computer's adaptability and wealth of software makes it an ideal choice for use with young children with handicaps and their non-handicapped friends.

Source: Preschool Integration Through Technology Systems, (PITTS), United Cerebral Palsy Association of Western New York, Inc. 4635 Union Rd., Buffalo, NY 14225; US DOE Grant #HO24E80010

GLOSSARY

This glossary contains terms used frequently in relation to computers. Knowledge of computer terminology leads to a better understanding of computer literature and improves communication with others in the field.

Adaptive Firmware Card: The Adaptive Firmware Card is a multipurpose peripheral card which allows for modification of the method of input and rate of presentation for many commercial software packages. A primary function of the Adaptive Firmware Card is to enable individuals for whom the computer's keyboard is inappropriate to use commercial software with a single switch. In addition, it allows for other methods of input including scanning, Morse code, and adaptive keys.

Adaptive Keyboard: Adaptive keyboards are generally attached to the computer with firmware cards. These keyboards are usually programmable and enable the user to send information to the computer in different forms. For instance, one key can be the equivalent of an entire word or phrase or representative of a functional command.

Backup: A backup is a duplicate made of a disk/file and kept on hand to avoid the loss of or damage to crucial data. It is highly recommended that backup copies be made for heavily used or favorite programs while the originals are kept on file.

Boot: The process of turning the computer on and loading a program into the computer's memory is known as a "boot." Reference is sometimes made to "cold or warm boots." A cold boot is performed when a program is loaded by turning on the computer. A warm boot is done by clearing one program from memory and loading another without turning the computer off.

Bug: An error in a computer program which keeps the program from running correctly.

Byte: A series of eight bits that represents a character, instruction, letter, or number to the computer as a unit of measure for computer memory.

CD ROM: Information is permanently burned into a disk using laser beams. A mold is made from a master disk and plastic copies are duplicated from the mold. The disks, about 4¾″ in diameter, are read by a laser beam in a CD-ROM drive that is attached to the computer. Because you cannot erase information on a CD-ROM disk, it is ideal for storing databases and other large amounts of information.

Central Processing Unit: The CPU is the main brain of the computer. It is the unit in the computer that processes data, stores data, and retrieves data from memory. When the CPU consists of only one chip, it is called a microprocessor.

Character: A character refers to any letter, punctuation mark, space, or digit used to represent information.

Chip: A chip is an integrated circuit containing microscopic switches etched in a small piece of silicon. These chips carry out the processing of data. Chips may hold data permanently or temporarily. They often look like thin, black rectangular boxes with spike-like connectors coming out of the bottom. They either plug into or are soldered into the circuit boards of the computer.

Click: To position the pointer on an object on the screen, then press and quickly release the mouse button.

Clipboard: The holding place for information that was last cut or copied; a buffer area in the computer's memory.

Computer Assisted Instruction (CAI): CAI refers to instruction which is conducted or augmented by a computer. CAI software includes drill and practice, tutorials, simulations, problem solving, and educational games.

Computer Managed Instruction (CMI): CMI is intended to make instruction management and record-keeping easier and more efficient. These are teacher-oriented rather than student-oriented programs. For example, the computer might keep records, test results, and progress reports; the computer might generate materials (IEPs) or test students and prescribe appropriate work.

Crash: A crash occurs when a program quits working as it should or the disk is damaged. Most often a crash is permanent damage to the data on a disk, but in some instances it can be a temporary problem due to static or incorrect disk drive speed.

Cursor: A cursor is a small, often blinking, symbol which appears on the monitor. It indicates that the computer is waiting to receive information.

Daisy-chain: To connect a series of peripherals (e.g. disk drives) to the computer. The first is connected directly to the computer; the second is connected to the first, and so on.

Debugging: Debugging is the process of looking for and removing the bugs or errors from a computer program.

Disk: A disk (also known as a diskette or floppy disk) is a piece of magnetic storage material similar to recording tape. It is enclosed in protective covering and is used to store computer programs or data. A 5.25" disk has the storage capacity of 143K (or about 70 pages of text). A 3.5" disk has the storage of 800K (or about 400 pages of text).

Disk Drive: A drive is a mechanical device that stores information on and retrieves information from a disk.

Disk Operating System (DOS): This program informs the computer how to use a disk. It tells the computer how to distribute information on the disk and how to read information from the disk.

Documentation: Documentation refers to the instructions or manual which accompanies commercial software programs.

Expanded Memory: Expanded memory refers to added memory, which gives more RAM storage to the computer. (see **Memory, RAM, ROM**)

Firmware: Sometimes considered "hard software," these chips can be found on firmware cards placed in the expansion slots of the logic board. Firmware contains instructions in ROM to operate peripheral devices (e.g. speech synthesizers).

Firmware Card: (see **Interface Card**).

Game Port: (see **Port**).

Graphics or Touch Tablets: Input devices that transfer an image created on a touch sensitive workspace to the computer monitor. A software program and stylus accompany this flat, tracing pad type peripheral. Some instructional software is also available and requires the user to press an area on the pad to operate the program. The area is usually defined with an overlay which is placed over the activation area of the touch tablet.

Hard Copy: A printed copy of the computer program or text.

Hard Drive: A hardware device installed inside or outside of a computer which can store very large amounts of information. Commonly 10MB, 20MB, 40MB, or 60MB.

Hardware: Hardware refers to the electronic and mechanical components which make up the computer system. These usually include the computer, monitor, disk drive, and printer.

Hypercard: This complete visual information center allows you to customize, organize, retrieve, and deliver information. Like a Rolodex card system, one single card contains a set of specific information. Using hypercard they can be combined to create stacks which can contain text, sound, and graphics.

Hypermedia: Software developed by an author or publisher using hypercard functions that gives you ready made hypercard applications. (e.g. **Hyper Studio**).

Icon: (1) A graphic symbol on the back panel of the computer or its connecting cables which indicates where a device is to be connected. (2) In mouse-based applications, a graphic symbol on the screen that represents a disk, a document or file, or anything that can be selected.

Initialize: Initializing (formatting) electronically divides the disk into sectors and tracks which the computer uses for areas of data storage. When a disk is initialized or formatted, it is prepared to receive data. Caution should be used when initializing a disk since any information already on the disk being initialized will be erased.

Input Device: An input device is a component or peripheral which allows the user to enter information into the computer. The most common input device is the keyboard. Alternative input devices include switches, touch tablets, joysticks, paddles, and adaptive keyboards.

Interface: A device which allows the computer to communicate and work with another device (such as a printer). The term also refers to the physical place where the two are connected.

Interface Card: A circuit board which is inserted into one of the expansion slots of the computer which enhances the capabilities of the computer (for example: FingerPrint®, Adaptive Firmware Card™, or Echo™).

Joystick: Commonly used for games, this input device has a control stick and two buttons. Rotating the stick moves the cursor (or action figure) in a 360 degree circle. The buttons can be used to control other features of the program.

K: In reference to computers, K stands for kilo or 1000 (actually 1024) units of memory/storage. These units are counted in bytes; therefore, a computer of 64K has the storage area for 64 kilobytes of data.

Keyguard: A device that covers the keyboard and allows the users to move their hands over the surface without accidently activating the keys. The keyguard also provides direction for a finger or prod.

Language: A programming language is a set of commands which can be used to instruct the computer to perform specific tasks. Three of the most popular languages used in education are BASIC, Pascal, and LOGO.

Logic Board: This is the main circuit board in a computer and is sometimes called the **Mother board**. It contains the central processing unit (CPU), RAM, ROM, and other specialized chips and circuitry.

Medium or Media: Any material which can store data and/or programs can be called a medium. Examples include disks, punched cards, and cassettes.

Megabyte: A unit of measure for computer memory. One megabyte equals 1,048,576 bytes or characters.

Memory: Chips in the computer which have the capacity to store information. (see **RAM** and **ROM**)

Modem: A modem is a peripheral device which allows a computer to transmit and receive data from another computer over telephone lines. The word modem is derived from the words MOdulate/DEModulate.

Mouse: A computer device that controls the pointer on the screen. Rolling the mouse on a flat surface next to the computer causes the pointer to move correspondingly. The button on the mouse is used to select an icon or a computer function from the menu.

Output Device: Output devices, including monitors, printers, speech synthesizers, and robots, receive information produced by the computer and make it available to the user in an understandable form.

Paddles: Paddles are input devices which operate by turning one or both dials or by pressing the buttons. Often used for games, one dial moves the cursor (or action figure) horizontally and the other vertically. Some programs require the user to control the action using only the buttons.

Peripheral: A hardware device which is outside of, but connected to, the computer is called a peripheral. These include input and output devices such as joysticks, paddles, graphics or touch tablets, adaptive keyboards, printers, speech synthesizers, and robots.

Port: A socket on the back panel or on the logic board of the computer for connecting peripheral devices.

Printer: An output device for printing data onto paper. There are several types of printers. A dot-matrix printer is an impact printer which prints characters and graphics composed of dots. A daisy wheel printer is a letter quality, impact printer which prints pre-formed characters that are located on a printwheel or ball. A laser is a non-impact printer which uses a laser to make high-quality impressions.

Program: A program is a set of instructions, written in a language the computer understands, which allows the computer to perform a function or task.

Public Domain Software: Software that is not copyrighted.

Random Access Memory (RAM): A temporary storage area for programs and data. This information can be easily altered or deleted. When the computer is turned off, this information is erased. Therefore, data of this sort is stored on disk or cassette and retrieved when needed.

Read Only Memory (ROM): This information is stored permanently and remains available for the computer to use. It may not be altered or erased. It usually includes operational instructions for the computer such as the program to boot the computer and a computer language such as BASIC. This information is not lost when the computer is turned off.

Scanning: To automatically step through allowable responses which users select by activating a switch.

Shareware: Public domain software you can try out. If you like it and decide to use it, you send a donation or stipulated fee (usually small) to an address indicated in the program.

Slot: A long, narrow, numbered (1-7) socket on the logic board of the computer where interface cards are inserted.

Software: The programs used by the computer. Programs on both 3.5" and 5.25" disks are referred to as software.

Speech Synthesizer: Speech synthesizers are output devices which enable computers to "speak" by converting text characters into artificial speech.

Switch: A hardware device used in place of the standard keyboard that allows people who have little motor control to use the computer.

Switch Interface: Hardware that allows the switch to be connected to the computer.

Text-to-Speech: Speech output equipment that will pronounce whatever text is input.

Touch Tablet: A flat-surfaced input device. By touching the surface, the users generates input to the computer.

Word Processing: Writing, editing, formatting, and printing of text and documents on a computer system. These programs allow for easy insertion, deletion, and movement of text which permits full revision and print out in a short time.

Write-Enable: There is a small notch in the upper-right corner of a 5.25" disk. If the notch is uncovered, the disk is write-enabled and the user is able to add to, delete, and change information stored on it. On a 3.5" disk, the disk is write-enabled when the small piece of plastic covers the square hole in the upper-right corner.

Write-Protect: Changes cannot be made to the information stored in a write-protected disk. To prevent changes to the contents of a 5.25" disk, cover the notch. Slide the small plastic tab to uncover the square hole on a 3.5" disk to write-protect it.

Source: Building ACTTive Futures, ACTT's Curriculum Guide for Young Children and Technology, Macomb Projects, College of Education, Western Illinois University, Macomb, IL 61455

COMPUTER TIPS

ORGANIZATION

Software programs are stored on a disk and can be susceptible to damage. Take time to back up or duplicate your disk in case it is destroyed. Every disk should be backed-up to protect your software.

Copyright laws allow you to have one back-up copy of any computer program that you purchase. If you can't make a copy, contact software publisher and ask about their replacement policy.

Consult your computer Owner's Manual on copying disks. Make sure to format or initialize a blank disk before you begin. There are also commercial software programs made for this purpose.

Store the original disks in a separate case from the copies that are used.

Label each disk precisely with program, publisher, and date.

SOFTWARE

Store disks in a dust proof container that provides for ultraviolet screening.

The **RETURN** key may be required after a key selection, for an "entry" command.

The **ESCAPE** key often takes you back to the main menu.

Make sure that the **CAPS LOCK** key is down when using most software programs.

To start a disk with the power on; insert a disk into the drive and press the keys **Control/Open Apple/Reset,** all at the same time.

HARDWARE

Make sure the power is off when connecting or removing peripherals.

Only one alternate input device should be connected to the computer at one time.

When adding circuit cards or connecting peripherals to the inside of the computer, make sure to touch the power supply box before you begin.

If you are having trouble with the computer working properly, check that all the connections are secure (wall circuit, monitor, printer, peripherals, etc.).

Turn off the computer when it is not in use.

Source: Preschool Integration Through Technology Systems, (PITTS), United Cerebral Palsy Association of Western New York, Inc., 4635 Union Road, Buffalo, NY 14225; US DOE Grant #H024E80010

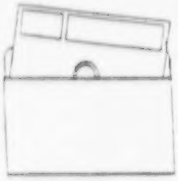
A-L4

STARTING UP A SOFTWARE PROGRAM

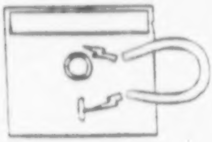
1. Make sure the computer is off.
2. Remove the disk from the paper envelope by holding the label end.
3. Slowly insert the disk into the disk drive and close the door.
4. Turn on the computer.

Source: Preschool Integration Through Technology Systems, (PITTS), United Cerebral Palsy Association of Western New York, Inc., 4635 Union Rd., Buffalo, NY 14225; US DOE Grant #H024E80010

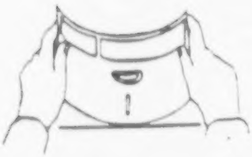
CARING FOR DISKS



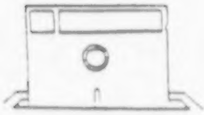
Store the disk inside the paper envelope or sleeve and then place them in the dust free container vertically.



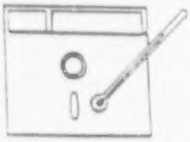
Keep your disks away from any source of magnetism like a stereo, TV, a household appliance, and even the top of the disk drive. Data is stored on the surface of magnetically coated film under the jacket of the disk.



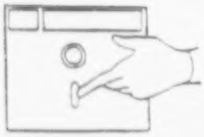
Handle the disk carefully. Bending the jacket may cause damage to the disk. Do not use paper clips on the disk.



When inserting the disk into the disk drive, be sure to put it in straight. Rough treatment can cause damage to the jacket or the disk.



Store the disk away from direct sunlight, moisture, and extreme temperatures.

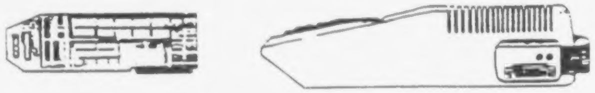


Fill out the labels for the disks before you place them on the disk itself. Do not touch the disk where the jacket does not protect it. Always handle and hold the disk by the label.

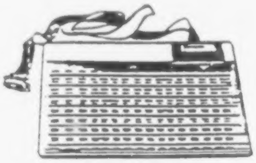
Source: Preschool Integration Through Technology Systems, (PITTS), United Cerebral Palsy Association of Western New York, Inc., 4635 Union Road, Buffalo, NY 14225; US DOE Grant #H024E80010

THE ADAPTIVE FIRMWARE CARD INPUT DEVICES

There is a wealth of preschool software designed for the standard keyboard that will not work with the Touch Window, Power Pad, Muppet Learning Keys, or a joystick. In order for preschoolers with handicaps to use these software programs with input devices that are more successful for them, the computer itself must be modified. By adding the Adaptive Firmware Card (AFC) to the computer, the following devices can be used with any software program designed for the keyboard.

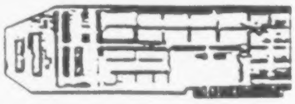


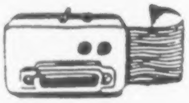
The **ADAPTIVE FIRMWARE CARD** is installed in the computer. Its control box attaches to the card and is used outside the computer as a plug-in port for the following input devices.



The **UNICORN BOARD** is a touch sensitive keyboard which allows users to customize overlays for individual software programs using pictures to indicate the correct key to select. Press areas can be large or small and positioned anywhere within the surface of the board.

NAME: **ADAPTIVE FIRMWARE CARD**





MANUFACTURER: Don Johnston Developmental Equipment, Inc.
P.O. Box 639
1000 N. Rand Road, Bldg. 115
Wauconda, IL 60084
(312) 526-2682

DESCRIPTION: The Adaptive Firmware Card System consists of an internal printed circuit card and an I/O box. The system allows a computer to be accessed transparently by any one of 16 special input methods for people who cannot use the standard keyboard or who find an alternate input method more efficient. To use the Adaptive Firmware Card System, you need an input device (such as an expanded keyboard or switch) which you must purchase from another source.

REQUIRED SOFTWARE: The first time you install the Adaptive Firmware Card, you must use a special piece of software (included with the system) which sets up the system and tells the computer which input device you will use and its special input method. This set up allows the user to run commercial software with special input methods and rates.

CONNECTION: The circuit card fits into one of the expansion slots inside the computer. No technical expertise is required for installation. The I/O box easily mounts on the side of the computer. The switch or other input device (supplied by the user) plugs into this I/O box.

COMPUTER: Models are available for Apple computers.

APPLICATIONS: The Adaptive Firmware Card enhances the computer and allows transparent access to most software. The user can select any one of sixteen input methods depending on his or her physical ability and the type of access device. Input methods range from alternative keyboards, scanning for switch use, to morse code. The card can also slow down the response time required in interactive programs. It also permits the computer to be used as a rudimentary communication device.

PHYSICAL ABILITY: Depending on the access device used, almost any degree of pressure can be selected.

PRICE: Apple IIe with 64k (C40) $400.00, Apple IIgs (G32e) $520.00

Source: Preschool Integration Through Technology Systems, (PITTS), United Cerebral Palsy Association of Western New York, Inc., 4635 Union Rd., Buffalo, NY 14225; US DOE Grant #H024E80010

LEVEL: ADMINISTRATOR

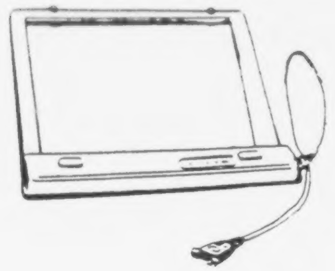
GOAL: **#3** Gain introduction to basic use of computer and peripherals with young children who have disabilities.

COMPETENCY TYPE: SKILL

OBJECTIVE: Participants will identify computer components and peripherals.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
1. Large group activity Using provided Handouts on each peripheral, briefly discuss the use of each. Point out the connections on the computer.	1. Handouts (A-H8-13) *Touch Window* *Power Pad* *Muppet Learning Keys* *Echo Speech Synthesizer* *Unicorn Expanded Keyboard* *Keyboard Modifications* This experience will be *greatly* enhanced by the display of as many of the above peripherals as possible.	1. As each peripheral is discussed, discuss how a child with a disability would benefit. Although these peripherals may have their most direct benefit for children with physical limitations, they can benefit all young children because of their concrete nature and simplicity of use. Try to point out that children with learning or developmental disabilities can also gain more appropriate access to the computer with the usage of these peripherals. Leader can refer to the more extensive notes on each of the peripherals contained in the Staff Handouts section (Handouts S-H9, 11, 13, and 15).

NAME: **TOUCH WINDOW**



MANUFACTURER:
Edmark Corporation
P.O. Box 3903
Bellevue, WA 98009-3903
(206) 746-3900
(800) 426-0856

DESCRIPTION: The Touch Window is a touch sensitive pad or screen designed as an alternative to the standard keyboard. It attaches to the computer monitor with velcro strips. Users simply touch the screen to input information into the computer.

REQUIRED SOFTWARE: Only software designed for the Touch Window will work with this device.

CONNECTION: This board easily plugs into the back of the microcomputer via the 9 pin game I/O port.

COMPUTER: Models are available for Apple and IBM computers.

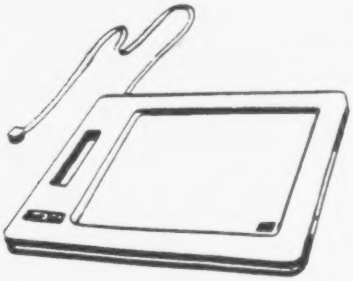
APPLICATIONS: The Touch Window has numerous applications for young children with handicaps as it responds to the lightest touch of a finger or stylus and provides the most direct input.

PHYSICAL ABILITY: Only a very light touch is required to activate the Touch Window.

PRICE: Approximately $250.00 (Apple) and $300.00 (IBM).

Source: Preschool Integration Through Technology Systems, (PITTS), United Cerebral Palsy Association of Western New York, Inc., 4635 Union Road, Buffalo, NY 14225; US DOE Grant #H024E80010.

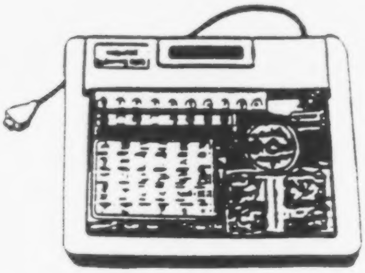
NAME: **POWER PAD**



MANUFACTURER:	Dunamis Inc. 3620 Highway 317 Suwanee, GA 30174 (800) 828-2443
DESCRIPTION:	The Power Pad is a touch sensitive pad designed as an alternative to the standard keyboard. Overlays define press areas necessary to activate special software programs.
REQUIRED SOFTWARE:	The Power requires special software. Each program comes with a corresponding overlay. Apple computers require software designed for the Power Pad. An IBM starter kit is required for the IBM version of the Power Pad.
CONNECTION:	The Power Pad connects to the computer through the 16 pin game I/O port located inside the Apple computer. The use of an extender cable such as the Scooter Port or Power Port, permits the Power Pad to be plugged in externally. The IBM version of the Power Pad connects to the computer through a parallel interface and a Power Pad connector cable is required.
COMPUTER:	Models are available for Apple, IBM, VIC, and Commodore computers.
APPLICATIONS:	The Power Pad utilizes a variety of overlays which, when coupled with their accompanying software, turn the Power Pad into an alternative keyboard, a communication board, a game board, a piano keyboard, a learning center, or a graphics tablet. A variety of software programs and tool kits have been developed for the Power Pad with the handicapped individual in mind.
PHYSICAL ABILITY:	A moderate amount of pressure is required to activate the Power Pad.
PRICE:	Approximately $200.00 for Apple and IBM version; this price includes Power Port, cable, and tool kit software.

Source: Preschool Integration Through Technology Systems, (PITTS), United Cerebral Palsy Association of Western New York, Inc., 4635 Union Road, Buffalo, NY 14225; US DOE Grant #H024E80010.

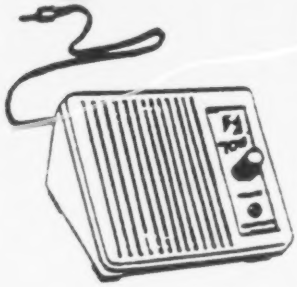
NAME:	**MUPPET LEARNING KEYS**



MANUFACTURER:	Sunburst Communications 39 Washington Avenue Pleasantville, NY 10570 (800) 628-8897 (914) 769-5030
DESCRIPTION:	Muppet Learning Keys is a touch sensitive keyboard designed especially for use with children. Letters and numbers are arranged in sequence. Other keys (i.e., stop/go) are marked with pictures of popular Muppet characters or colorful graphics.
REQUIRED SOFTWARE:	The keyboard works with specially designed educational software that is available from the manufacturer. Several different software programs have been designed to be used with the keyboard. Also available is a tool kit which allows educators to design their own software for the keyboard.
CONNECTION:	The Muppet Learning Keys easily plugs into the back of the computer via the 9 pin game I/O port.
COMPUTER:	Models are available for Apple and IBM computers. An adapter is needed for Apple II, II+.
APPLICATIONS:	Although this keyboard was originally designed for non-handicapped preschoolers, it can be used by young children with handicaps with no modifications. However, some educators have developed cardboard masks to define specific keyboard areas and to block out distracting keys. Others have developed picture overlays to be used with specially designed software.
PHYSICAL ABILITY:	The keys require a moderate amount of pressure within a half inch press area to be activated.
PRICE:	Approximately $129.00 (includes "Muppets on Stage" software)

Source: Preschool Integration Through Technology Systems, (PITTS), United Cerebral Palsy Association of Western New York, Inc., 4635 Union Road, Buffalo, NY 14225; US DOE Grant #H024E80010

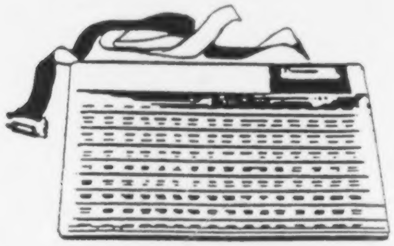
NAME:	**ECHO SPEECH SYNTHESIZER**



MANUFACTURER:	Street Electronics Corporation 6420 Via Real Carpinteria, CA 93013 (805) 684-4593
DESCRIPTION:	The Echo Speech Synthesizer is an internal printed circuit card and speaker system which brings speech output to a computer. It has two voice modes: a limited vocabulary, natural sounding female voice; or an unlimited vocabulary, robotic voice. The board can also generate sound and music.
REQUIRED SOFTWARE:	Only software that has been designed for the Echo Speech Synthesizer will actually "talk." If the card is not placed in the computer, software designed to "talk" will operate, but the user will not hear the voice or sound. The Echo IIb permits all computer sounds to emit through the attached speaker which comes complete with volume control and headphone jack.
CONNECTION:	The circuit card fits into one of the expansion slots inside the computer. No technical expertise is required for installation. The speaker plugs into the card.
COMPUTER:	Models are available for the Apple II+, IIe, IIGS; IBM PC computers.
APPLICATIONS:	Speech synthesis enhances software and has many applications for the young handicapped user which include: reading directions, giving verbal prompts, and providing feedback and motivation. Its text-to-speech program gives the Apple an unlimited vocabulary.
PHYSICAL ABILITY:	No physical ability is required to use this device.
PRICE:	$129.95

Source: Preschool Integration Through Technology Systems, (PITTS), United Cerebral Palsy Association of Western New York, Inc., 4635 Union Road, Buffalo, NY 14225; US DOE Grant #H024E80010.

NAME: **UNICORN EXPANDED KEYBOARD**



MANUFACTURER:
Unicorn Engineering Company
6201 Harwood Avenue
Oakland, CA 94617
(415) 428-1626

DESCRIPTION: The Unicorn Expanded Keyboard is an alternative to the standard keyboard. The 128 one inch square key areas can be redefined to create larger, but fewer key areas, so as to accommodate the physical capabilities of the users. When using commercial software with special software and a speech synthesizer, each key area can output a "spoken" message.

REQUIRED HARDWARE AND SOFTWARE: To operate the Unicorn Expanded Keyboard, the Apple user first needs to have an Adaptive Firmware Card installed in the computer. IBM systems require an IBM Serial Aid. Software designed for the Apple and IBM computers will operate with the Unicorn Expanded Keyboard.

CONNECTION: This board plugs into the I/O box which is part of the Adaptive Firmware Card system or PC Serial Aid.

COMPUTER: Models are available for Apple and IBM computers.

APPLICATIONS: The unicorn Expanded Keyboard allows complete keyboard access to individuals who have difficulty with the standard keyboard. Software programs can be activated by this input device which has the capability to group keys in order to enlarge the size of a press area, program active keys in a single section of the board (i.e., left side only) for individuals with limited motor use and permit speech output of user defined messages.

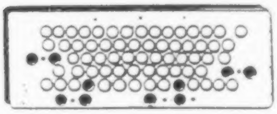
PHYSICAL ABILITY: A moderate amount of touch is required to activate the press areas. The Unicorn Expanded Keyboard has an adjustable response time. That means that the user can set the rate of activation of the keys. Keyguards and a dead-spot eliminator are also available through the vendor.

PRICE: $350.00

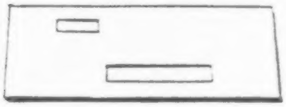
Source: Preschool Integration Through Technology Systems, (PITTS), United Cerebral Palsy Association of Western New York, Inc., 4635 Union Road, Buffalo, NY 14225; US DOE Grant #H024E80010.

KEYBOARD MODIFICATIONS

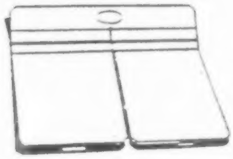
You may want to try modifying the standard keyboard to make it more successful for use by preschoolers with physical handicaps. The use of stickers to highlight important keys is one low cost suggestion. Other modifications include:



KEYGUARDS are plastic overlays with finger-sized holes that are placed over a keyboard. This prevents accidental key pressing.



Cardboard **MASKS** are placed over keyguards and are made to show only the keys that work individual software programs.



KEYBOARD COVERS are also placed over the standard keyboard and can be used with software which requires only two key selections.

Source: Preschool Integration Through Technology Systems, (PITTS), United Cerebral Palsy Association of Western New York, Inc., 4635 Union Rd., Buffalo, NY 14225; US DOE Grant #HO24E80010

644

LEVEL: ADMINISTRATOR

GOAL: **#3** Gain introduction to basic use of computer and peripherals with young children who have disabilities.

COMPETENCY TYPE: VALUE/ATTITUDE

OBJECTIVE: Participants will see the computer and peripherals as effective tools and understand that for some children, their use may provide the only means for participating in ongoing curricular activities.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
1. Individual or small group activity Each participant will attempt to "re-type" a paragraph while his/her hand is confined within a paper bag.	1. You will need: – Computers with a word processing program loaded (Magic Slate, Bank Street Writer, Muppets on Stage, or whatever you have). – "Lunch size" paper bags.	1. In discussion, emphasize that the computer and peripherals are *compensatory* tools for children with physical or cognitive limitations. Technology is a wonderful "equalizer"!
2. Large group activity Discuss the frustration felt in attempting to utilize a standard keyboard without the necessary physical abilities. Ask participants how children with similar limitations might feel when they cannot access the computer, and to discuss specific feelings and advantages which would result upon being provided a peripheral which allows them the ability to access the computer easily.		

GOAL 4

Technology

LEVEL: ADMINISTRATOR

GOAL: **#4** Explore how application of computers and peripherals can be successfully integrated within a curriculum for young children with special needs.

COMPETENCY TYPE: KNOWLEDGE

OBJECTIVE: Having viewed examples via tape and demonstration, participants will list and discuss ways that computer applications can be integrated within the ongoing preschool curriculum.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
1. Large group activity Introduce the concept of integration of computer activities within the curriculum with Transparency A-T3. Show video, *Computer Learning for Young Children*. Ask participants to identify specific ways computer seemed to be integrated within the goals and activities shown.	1. Transparency (A-T3) *Goal of Integrating Computers* Video: *Computer Learning for Young Children*, High/Scope Foundation (NOTE: Check with your local SERRC for a copy of this video. You may also contact MEO/SERRC or Cuyahoga SERRC to inquire about possible loans.)	1. As ideas are offered and discussed, point out how computer is utilized to accomplish the ongoing curricular goals rather than as a "separate," "free time," or "reward" activity. Point out how off-computer activities are used to prepare students for computer activities, and reinforce computer activities. Emphasize that computer activities are tied directly to instructional goals. Point out specific examples.
2. Large group activity Giving participants a copy of *ONE* of the Preschool Curriculum Activities (from ACTT), review each step, discuss, and demonstrate the appropriate software and peripheral(s). (Be sure to choose one that utilizes items that are available!) While reviewing the activity, discuss how a specific child's learning needs can be met. Point out various adaptations that can be made for children with specific disabilities. Emphasize how this activity can fit into the program's overall curricular goals.	2. Preschool Curriculum Activities (from ACTT): Choose *ONE* Handout (A-H14-19) *The Wheels on the Bus Sing* *Happy, Sad - Scared, Mad* *Brown Cow, Brown Cow* *Stickybear Sounds* *Is This a Farm?* *Facemaker Memory Game* – Computer, necessary software/peripherals. Leader Notes (A-L7) *Computer Applications for Children with Specific Disabilities*	2. This activity will be strengthened by the degree to which you are able to "recreate" the atmosphere of an early childhood activity. Use of the suggested reinforcing materials will increase the activity's impact. **Additional Note:** Based on the interests of the audience, you may wish to incorporate the adaptations for a specific disability into your demonstration. See section following each of the Curriculum Activities, or *Computer Applications for Children with Specific Disabilities* in the Leader Notes A-L7.

The goal of integrating microcomputers into the curriculum is to link software and computer activities with specific instructional objectives in ways that facilitate teaching and learning.

David Edyburn, *The Process of Integrating Software into the Special Education Curriculum*, Missouri Technology Center for Special Education.

The effective incorporation of computers into the classroom is dependent on the teacher's ability to develop computer activities that match the existing curriculum.

Trieschmann, M. & Lerner, J. W. (1990) *Using the computer to teach children with special needs: A Guidebook of effective computer strategies.*

THE WHEELS ON THE BUS SING

Content Area: Music, literacy, gross motor

Child Objectives:

1. Activate the PowerPad™.
2. Identify objects on the overlay.
3. Work cooperatively with others.
4. Develop social skills.

Materials:

Poster Board and large marker
Clear contact paper or some other laminating medium
Grease pencil
PowerPad™
Echo™ Speech Synthesizer
The Wheels on the Bus (UCLA/LAUSD)
Overlay

Procedures:

Related Activity:

1. Create an open ended song board with the poster board. Laminate or have it laminated so it can be written on, then wiped off and reused.
2. During circle time, sing the song, "The Wheels on the Bus," singing well known verses and making up new ones. Before each verse is sung, erase the last verse and write the new verse in the blanks on the song board.
3. Some children don't come to school on the bus; make up verses for "The Wheels on the Car" and sing to the tune for "The Wheels on the Bus." Write the words for each verse on the song board, again wiping off the last verse and inserting words for the current verse.

Computer Activity:

Before the activity: Install the Echo™ card in slot four inside your computer and plug the speaker wire into the card. Insert the 16-pin connection of the PowerPad™ cable to either the internal game port or an external EZ-port or PowerPort and the clip end of the cable to the PowerPad™. Boot **The Wheels on the Bus.** Secure the overlay to the PowerPad™. Place the monitor so all children will be able to see.

1. Continue this activity during circle time. Ask questions — "Who rides the bus?" "Where are the people on the bus going?" "Is a school bus the same as a city bus?" "How do we ride on a bus?" "Is riding a bus different than riding in a car?" "Is a car or a bus bigger?"
2. Pass the PowerPad™ to each child. As each child activates a space, part of the song will play. Encourage children to sing along.

Helpful Hints:

Often a firm press on the PowerPad™ is needed to activate the program. Encourage those with a light touch to press hard without banging on the Pad.

Variations:

See "Paint by Bus" in this section for another activity idea.

Adaptations:

Visual Impairment: Make a smaller version of the large story board with a variety of thick cardboard forms representing the people and objects from the song. As the story is created encourage the child to feel the forms to find the appropriate one to stick on his storybook. He can the "read" along with the rest of the children by feeling the forms in his book. For the computer activity, make a tactile overlay using textures or objectives, such as hair for mommy's head and a small bottle for baby.

Auditory Impairment: Use signs for the words on the story board. Ask child to use his own familiar signs to contribute to part of the story. During the computer activity, earphones can be used with the Echo to amplify the speech.

Motor Impairment: If the child is unable to sing along with the other children, a tape could be made of a family member, such as a brother or sister, or a friend singing the song. With the tape recorder attached to a switch, the child could then take part in the group activity by pressing his switch to make his tape sing. The tape could also be the background music for the song so that the child plays the music while the others sing. For the computer activity this child may need assistance in pressing the PowerPad™. A small wooden puzzle piece with a knob could also be held by the child when pressing on the Pad to help apply extra pressure.

Source: Building ACTTive Futures, ACTT's Curriculum Guide for Young Children and Technology, Macomb Projects, College of Education, Western Illinois University, Macomb, IL 61455

HAPPY, SAD — SCARED, MAD

Content Area: Social interaction, art, health

Child Objectives:

1. Interact with others
2. Express feelings verbally
3. Recognize feelings
4. Discriminate between anger and hurt

Materials:

Reproductions of art works of facial expressions (Mona Lisa)
PowerPad™
Echo™
Feelings (UCLA/LAUSD)
Overlay
Paper and crayons

Procedures:

Related Activity:

Find pictures of famous works of art. Calendars, posters, and museum post cards are good sources for these pictures. Laminate pictures for durability. During circle time present different images of faces. Ask the children to help you decide how the person in each picture feels. "Does that person feel happy, angry, scared, sleepy ...?" "What makes people feel like that?" "What happens to you to make you feel happy?" "Do you feel different when someone hurts your feeling and when someone makes you angry?" "What do you do when you feel angry?" "When you feel happy?" "What happens to your face when you feel that way?" Offer children the opportunity to draw a face or picture of how they feel.

Computer Activity:

1. Install Echo™ card and plug the PowerPad™ cord into the 16-pin internal game port or an external PowerPort and attach the other end of the cord to the PowerPad™. Boot the software program **Feelings** to be certain it works properly. Attach the **Feelings** overlay to the PowerPad™ Select the menu option you wish to use. Place the monitor where all children can see it.
2. This activity can be used in circle time or in small groups. Pass the PowerPad™ among the children. As each child activates an area on the PowerPad™, talk about feelings that might make your face look like the face on the monitor.
3. Encourage discussion about different kinds of feelings.

Variation:

Another software program that can be used in a similar way is **If You're Happy and You Know It** (UCLA/LAUSD). It is a PowerPad™ program also.

Adaptations:

Visual Impairment: Use dolls, masks, or textured pictures which have dramatic facial expressions for the child to feel. Offer the child the opportunity to feel your face as you make the different expressions, then encourage her to feel her own face as she tries to imitate the expressions. Use a textured overlay for the PowerPad™ activity. String or sandpaper could be used to form the different expressions on the overlay.

Auditory Impairment: Use signs to express the different feelings. Headphones could be attached to the Echo™ to amplify the speech in the program.

Motor Impairment: If child has difficulty pressing an area on the PowerPad™, a small wooden puzzle piece with a knob could be held while pressing to help in applying more pressure.

Source: Building ACTTive Futures, ACTT's Curriculum Guide for Young Children and Technology, Macomb Projects, College of Education, Western Illinois University, Macomb, IL 61455.

BROWN COW, BROWN COW

Content Area: Science, language development, color recognition, cooperative play, listening skills

Child Objectives:

1. Identify different animal sounds
2. Identify distinguishing characteristics of different animals
3. Work cooperatively with others

Materials:

PowerPad™
Echo™ speech synthesizer
Old MacDonald's Farm I and **II** (UCLA/LAUSD)
Overlay
Enlarged pictures from overlay copied on card stock, each animal colored one color (brown cow, black sheep, pink pig)
Laminating film or clear contact paper
Method for binding

Procedures:

Related Activity:

1. Prepare a book using the colored animals based on the story, "Brown Bear, Brown Bear."
2. During circle time, read the book with help from the children. "What color is the cow?" "What does the cow see looking at me?"
3. Question the colors of the animals. "Are there really purple ducks?" "Have you seen a green chicken?"
4. Talk about different kinds of animals, are they all farm animals? "What makes an animal a farm animal?"

Computer Activity:

1. Insert Echo™ card and plug in the PowerPad™. Boot the software and make sure the program works correctly. Turn off the monitor and turn down the Echo™ until you are ready for the computer activity. Secure the overlay to the PowerPad™.
2. This works well as a circle activity. Children can take turns activating the PowerPad™. Encourage discussion about what the animal is, where it lives, what it eats, and the names for the young (calf, piglet, chick, lamb).

Variation:

Sing "Old MacDonald Had a Farm" or "Did You Feed My Cow"; children can make up their own verses. When using **Old MacDonald's Farm II**, talk about the prepositions which are used in the program. Use plastic farm animals and a play farm scene to encourage children to move an animal in front of or next to something. Offer the children an opportunity to pretend they are animals themselves moving in different locations, as the animals in the software. Take children to visit or invite someone to bring small animals into the classroom, one or two at a time. Children need to touch and see the real thing.

Adaptations:

Visual Impairments: Use a textured book on farm animals. Also offer the child stuffed animals or plastic animals to feel the different features of each one. Talk about one characteristic feature of each animal, such as feathers for a chicken, and use that as the basis for making a textured overlay for the PowerPad™.

Auditory Impairment: Use signs for each of the farm animals. For needed amplification of the speech in the program, attach headphones to the Echo™ speech synthesizer.

Motor Impairment: If child has difficulty pressing an area on the PowerPad™, a small wooden puzzle piece with a knob could be held while pressing to help in applying more pressure.

Source: Building ACTTive Futures. ACTT's Curriculum Guide for Young Children and Technology. Macomb Projects, College of Education, Western Illinois University, Macomb, IL 61455.

STICKYBEAR SOUNDS

Content Area: Language development, initial sound comparison

Child Objectives:

1. Sort objects by beginning sound
2. Interact in a group situation
3. Identify objects

Materials:

Stickybear ABC's (Weekly Reader)
School box
Picture of Stickybear (use a FingerPrint card or another screen dump utility to print the picture)
Vinyl letters
Small objects with the same beginning sound and letter to put in the school box
Full sheet label

Procedures:

Related Activity:

1. Print Stickybear's face and shoulders on the full sheet labels, laminate the label and attach it to the lid of the box.
2. Stick a vinyl letter to the box and then fill it with objects having that beginning sound (dog, donkey, door).
3. Pass the box around the group. Each child selects an object, identifies it, and tells something about it. ("This is a sock." "It goes on a foot." "It's white.")

Computer Activity:

1. Boot software (the child can do this).
2. As the child explores the keyboard the association between the key pressed and the image on the monitor can be made.
3. Ask questions about the pictures, encourage discussion about what is happening in the pictures. Make a short rhyme about it (Boppy balls bounce) to chant.

Variation:

Nursery rhymes or other verses with repetitive first sounds could be repeated during the circle time (Peter, Peter, Pumpkin-eater). Books or stories that repeat sounds could also be read (Bippity Boppity Boo).

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Adaptations:

Visual Impairment: Attach textures to the stickers on the box so the child can identify the letter being used. Encourage the child to feel each object in the box as the beginning sound is discussed. Place textured stickers on the keyboard to help the child locate certain letters. Since there are many different sounds in this program, an association can be made between the sound and the letter. Help the child with the association by describing what is happening on the monitor.

Auditory Impairment: This activity offers a good opportunity to introduce or reinforce the sign for each letter in the alphabet.

Motor Impairment: If the child cannot use the keyboard, an alternate input device, such as a switch or Unicorn Expanded Keyboard™ and the Adaptive Firmware Card™ could be used with this program. Refer to the procedures in the section on applications for children with severe disabilities.

Source: Building ACTTive Futures, ACTT's Curriculum Guide for Young Children and Technology, Macomb Projects, College of Education, Western Illinois University, Macomb, IL 61455

IS THIS A FARM?

Content Area: Social Studies, language development, science

Child Objectives:

1. Develop identification skills
2. Express opinions verbally
3. Increase sorting skills

Materials:

Poster board
FingerPrint or another screen dump
Printer and four-color ribbon
Poster board
Laminating film or clear contact paper
Static cling vinyl
Puff paint or permanent ink markers
The Playroom (Broderbund)
Toy farm set

Procedures:

Related Activity:

1. Boot **The Playroom,** remove extra items from the farmyard and print the background. Glue the background to poster board and laminate. Use coloring books for tracing or drawing animal pictures; don't restrict the pictures to only farm animals. If you use other kinds of animals, you can make this a sorting activity. Trace or draw animals and objects onto static cling vinyl. Pay attention to relative size (cow is large, cat is small, pig is somewhere in between). Color and cut them out.
2. Discuss the kinds of animals and objects that could be found on a farm. "Are there differences between farm animals and other animals?" "What are different things you know?" Ask children to select farm animals or objects to stick to the farm scene and place them where they want.
3. Ask where the other animals and objects that are not farm related belong. "How do you know that?"

Computer Activity:

1. Boot **The Playroom** software and select the activity that contains the fairyland, mainstreet U.S.A., and a farmyard.
2. Before asking the children to participate in the activity, remove all the extra characters and objects in the scene. Continue the discussion about the kinds of animals you find on a farm.
3. As children make selections to add to the picture, question why they think that particular animal or object might belong in a farm scene.

Variation:

Katie's Farm (Lawrence Productions) is an excellent software program about farm life. It would be a nice addition to a farm unit. Also **Old MacDonald's Farm I** and **II** (UCLA/LAUSD) are PowerPad™ programs which could be used for the farm animal theme. Refer to "Brown Cow, Brown Cow" activity in this section. A field trip could be planned to visit a farm. Take pictures during the visit so that a book can be made about the children's experiences and the different animals, and activities on the farm. The book could be used as a related activity on another day. Dramatic play with the farm set provides opportunities to repeat the experience.

Adaptations:

Visual Impairment: Add textures to vinyl animals so that the child can feel to identify characteristics of different farm animals. Use a textured book on farm animals. Also offer the child stuffed animals or plastic animals to feel the different features of each one. Since the **Playroom** requires a visual orientation for controlling the cursor movement on the screen, another program, such as **Old MacDonald's Farm I** for the PowerPad™ may be more appropriate. Talk about one characteristic feature of each animal, such as feathers for a chicken, and use that as the basis for making a textured overlay for the PowerPad™.

Auditory Impairments: Use signs for each of the farm animals.

Motor Impairment: An alternate input device, such as a switch or Unicorn Expanded Keyboard™ could be set up with the Adaptive Firmware Card™ to take the place of the mouse. See the "Hidden Fish" activity in this section for procedures. Also a joystick or Touch Window®could be used with this program. (Note: Touch Window®input with Explore-a-Story programs is not the best. Objects move separate from where the child points.)

Source: Building ACTTive Futures, ACTT's Curriculum Guide for Young Children and Technology, Macomb Projects, College of Education, Western Illinois University, Macomb, IL 61455

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FACEMAKER MEMORY GAME

Content Area: Visual memory, thinking skills

Child Objectives:

1. Use the icon cards to develop a pattern for the face to perform
2. Chart sequences
3. Program the face to complete the charted sequence.
4. Imitate facial gestures that illustrate feelings

Materials:

Facemaker Golden Edition (Spinnaker)
Prepared icon stickers for animation
Prepared icon cards for charting and creating patterns of sequential animation.

Procedures:

Related Activity:

1. Have several activities available near the computer center for children to construct faces. Crayons and paper plates, felt board and "face" pieces, Mr. Potato Head, clown make-up and mirrors, materials for a "Do it Yourself" bulletin board.
2. Conduct a feelings or expressions lesson. Discuss the way people's faces look when they are happy, sad, angry, tired, afraid, surprised, worried or confused. Write experience stories about some of these feelings and have children illustrate their stories.
3. Have children recall a series of events periodically during the day beginning with a two-step memory series and moving to a four-step series. "What did you do first when you came to school?" "Then what did you do?"

Computer Activity:

1. Choose a child to insert **Facemaker** disk into drive and close the drive door. Ask another child to turn on the computer and monitor. Place icon stickers over appropriate keys and review what each sticker represents. (See documentation for details).
2. Ask the children to "build" a face that can be used in the "game" section.
3. When a face is completed direct children to the "program" option and use icon cards to develop a series of patterns for the face to repeat. Chart the sequences and repeat the programmed series by pressing "return." Mix up cards and repeat animation again. Ask children to put the cards back in order again the way the face shows them to us. Start with two or three icons at a time and increase icons as children in the group master the task.
4. Encourage children to develop the ability to remember a series of actions in a specific order. Use icon cards to help children remember the order of the series of animation. Using icon cards which match the represented sticker icons children can organize their thoughts and continue to work together for longer periods of time with this program. Remove the use of icon cards as the activity is repeated increasing the opportunity for children to rely on visual memory and sequential thinking skills.

Variation:

1. Ask children to imitate the face on the computer. Have them program each other using the icon cards or verbal instructions.
2. Present a printer activity using **Mask Parade** (Springboard) to construct a mask. Encourage construction of masks that show a variety of feelings so they can be used in a discussion group and later used on a bulletin board.
3. Use ideas from the "Happy, Sad — Scared, Mad" activity.

Helpful Hints:

Some children may have trouble recognizing the differences in the facial movements. The "cry" and "wink" gestures made with the eyes and the "smile" and frown gestures made with the mouth may be difficult for some children to identify. Visual discrimination details can be pointed out for the children, for instance, "Watch for the tear when the eyes cry," and "Look at the man's eyes when he is sad; they look different than when he is happy." Children may need to troubleshoot by reorganizing their commands if a sequence is not correct. Vary the number of items in the sequence since some children may need shorter sequences than others.

Adaptations:

Visual Impairment: Use amplified speaker to increase the sound the program makes as the face becomes animated. Attach tactile clues to the keycaps of the keys which operate the program. Be sure to select a black screen as the white screen is more difficult to see.

Auditory Impairment: Use amplified speaker or headphones depending on the degree of severity of the hearing loss.

Motor Impairment: Use the Adaptive Firmware Card with simplified scanning array to allow for single switch input. Begin with three scanning items and gradually add the rest of the facial features as the child becomes more familiar with the scanning of words or symbols.

Source: Building ACTTive Futures, ACTT's Curriculum Guide for Young Children and Technology, Macomb Projects, College of Education, Western Illinois University, Macomb, IL 61455.

COMPUTER APPLICATIONS FOR CHILDREN WITH SPECIFIC DISABILITIES

In this section, we consider the needs of children with specific disability areas. The following discussion is categorized in two groups: (1) general considerations for using computers with children with various disabilities and (2) specific considerations for children with autism, visual, hearing, and physical disabilities. Each discussion includes information for children whose levels of impairment range from mild to severe. It is important that computer activities are designed to meet the individual, cognitive and physical needs of each child.

GENERAL CONSIDERATIONS FOR USING COMPUTERS IN ALL DISABILITY AREAS

The following guidelines should be taken into account when using computers with children who have special needs.

- Give clear, concise directions to children about how to control the computer.
- Post reminders to assist children who need help in locating control keys. For example, place stickers or symbols on the keyboard or adaptive device.
- When appropriate, use real objects or props in conjunction with computer activities. This can assist children in transferring skills to various environments.
- Place a speaker on top of the monitor to direct children's attention to the text or graphics. This also allows the teacher to easily control the volume of the computer sounds.
- Structure activities to enhance communication and interaction with the teacher or other children.
- Provide children with choices and control within computer activities.
- Plan lessons that will allow the children to create products, e.g., a printed story, picture, or an audio tape of a song created on the computer.
- Allow children to utilize a variety of input devices to control the computer.
- Select software that is open-ended and allows for individual levels.

CONSIDERATIONS FOR USING COMPUTERS IN SPECIFIC DISABILITY AREAS

Children with Mental Delays

Most children with mental delays respond positively to computer activities. Depending on the software, the computer can be forever patient, highly motivating, and easily controlled. The selection of software programs should be based on the children's interests and cognitive abilities. Children with severe mental impairments may use the computer only as a "cause and effect" toy to be turned on and off. Other children may use it to learn survival signs. Although most children respond positively to sound, lights, movement, and music these attributes are especially enticing for children with severe mental delays.

Children with mild to moderate mental delays should be able to use software programs that have two or more commands. These commands can be represented by pictures, letters, or stickers. Children should learn to use several input devices in order to access a variety of software programs. For example, a child may be able to easily manipulate a joystick, but have difficulty utilizing the keyboard. This may limit that child in using certain software programs. Adapting the keyboard with a keyboard overlay and colored stickers may provide the child with the cues needed to control the program. Touch pads, switches, joysticks, and keyguards have been successfully used by many of these children.

Children with Visual Impairments

It is obvious that children with visual impairments will have difficulty interacting with the computer since the output is typically visual. Adaptive devices for visually impaired individuals include braille keyboards, braille screen readers, braille printers, large screen displays, and software programs that use speech synthesizers. Children should be individually assessed to determine which software programs and adaptive devices are most appropriate. Many children with visual impairments do have some vision so that minimum feedback is possible. Some children with visual impairments have enough vision to see the text and graphics on the computer monitor if screen enlargement devices are used.

It is important that children with visual impairments feel comfortable in the computer environment. Allow time for the children to physically explore the room and the computer before activities are introduced. Let them touch all the components of the computer, including a blank disk.

Consistent use of software programs is important for all children, but especially for children with visual impairments. Familiarity with a specific computer program or adaptive device can provide an anchor and comfortable environment for these children.

Suggestions for Using Computers with Children Who Have Visual Impairments

- Use programs that include large graphics, as well as animation, sound, and music.
- Place tactile stimuli on the keyboard, keyguard, keyboard covers, and touch pads to help children distinguish between various control keys.
- Utilize the directional capabilities of the joystick to assist children in controlling the computer.
- Place a speaker on top of the monitor to assist children in locating the visual screen display.
- Program the Unicorn Board to speak the commands that the children give the computer.
- Utilize software that is compatible with a speech synthesizer or text-to-speech output or input.

Children with Hearing Impairments

Since the computer is such a visual medium, many children with hearing impairments readily attend to computer activities. In fact, some children with hearing impairments tend to become so engrossed in the computer screen that they are reluctant to communicate or cooperate with peers or teachers.

In order to avoid "losing" these children to the computer generated text and graphics, activities that encourage communication and cooperation should be selected. Using props in conjunction with computer activities can attract the child away from the screen and toward another medium, the teacher, or a classmate. For example, when using a counting software program, provide counters and containers so the child can count with the computer and also with the objects.

Some of these children are able to take advantage of software with sound through the use of volume controlled adaptive devices such as head phones or external speakers.

Suggestions for Using Computers with Children Who Have Hearing Impairments

- Use real objects or props with computer activities.
- Use an external speaker to control the volume of the software program.
- Remove other visual and auditory distractions from the area.
- Verbally repeat or manually sign the words that the computer speaks or sings.
- Develop cooperative computer activities to stimulate communication.

Children with Language Disorders

Software programs that encourage receptive and expressive language are particularly suitable for children with language disorders. Animation, music, and speech synthesis are important features of these software programs.

Speech synthesizers provide a particularly stimulating environment for children with limited language skills. Children should comprehend the speech and understand the meaning of each word that the computer speaks. The lesson plans should include activities in which computer generated words are verbally used and repeated by the children. Through the repeated use of specific software programs children gain familiarity with the language associated with those programs, and the ability of the children to use words, phrases, and sentences increases.

Children with Physical Impairments

For children with physical impairments the computer may be one of the few objects that they can manipulate independently. Adaptive devices, such as the joystick, touch window, PowerPad, Unicorn board, Adaptive Firmware Card, and switches provide children with physical impairments access to computer software. It is important that these children be positioned in the most optimal manner to access the computer. Positioning should be determined through consultation with the child's occupational or physical therapist.

A specific child may find initial success with one type of input device, but it is important not to limit that child to that single device. The ability to use a variety of input devices allows the child access to a wider variety of software programs.

The selection and use of adaptive devices, such as mouthsticks, headpointers, miniature keyboards, optical headpointers and keyboard emulators should always be prescribed by the child's occupational or physical therapist. These devices can be programmed or designed to control software programs.

Some children with physical handicaps have augmentative communication systems; devices that allow them to communicate through pictures, symbols, or synthesized speech. Many of these systems can be hooked up to the computer and used as input devices. It is always best to contact the company that developed the communication system for assistance in connecting the device to the computer.

Suggestions for Using Computers with Children Who Have Physical Impairments

- Obtain assistance from the child's physical or occupational therapist to determine optimal positioning.
- Provide the child with opportunities to utilize a variety of input devices.
- Be aware of each child's physical reactions to specific visual or auditory output from the computer. Some programs may be overstimulating for certain children.
- Utilize software that includes voice output for non-verbal children.

Children with Autism

Children with autism, or "autistic-like" behaviors, generally interact well with computer activities. In addition, interaction between children and between children and teachers can be increased through the use of microcomputers. Graphics, animation, and sound are likely to capture the interest of children with autism. Communication, interaction, and turntaking should be incorporated into as many computer sessions as possible.

The methods of computer use and software selection could have a positive or negative effect on an autistic child. Therefore, it is important to select software programs that are motivating and have the potential to be interactive. Since some children with autism tend to display perseverative behavior while using the computer, it is imperative that activities be structured so the child is required to interact with others before, during, and after the computer activity. Learning to communicate and interact with others are key goals for most children with autism.

Suggestions for Using Computers with Children with Autism

- Structure activities to enhance communication and interaction with the teacher or other children.
- Provide children with choices and control within the activities.
- Utilize software programs that include speech output.

Children with Learning Disabilities

Children with learning disabilities are able to use most software programs and various input devices, including the regular keyboard. When selecting software and creating activities, the teacher should be sensitive to the various levels of achievement, styles of learning, and areas of academic success and difficulty.

The computer can be a highly motivating tool for children with learning disabilities. Adapting the input method for various children may allow them to interact with the computer independently. If a child has difficulty with directionality and cannot use the joystick, then the arrow keys on the keyboard may be used.

Many children with learning disabilities may be above age level in certain skill areas even though they are below in others. Therefore, these children need challenging, stimulating, and interactive learning experiences. In general, the computer is a highly motivating medium for most children with learning disabilities.

Children with Behavior or Emotional Disorders

One of the characteristics of children with behavior or emotional disorders is that they can be easily frustrated. They tend to work well with the computer as long as they are allowed some control over the program. Open-ended programs with few right or wrong answers should be used when the children are first introduced to the computer.

All children need to feel competent and safe in new situations, but for children with behavior or emotional problems the impact of the initial computer contact can have a direct effect on their desire to use it. The first computer session should be planned so that children become aware of the basic structure and format of the sessions.

Another characteristic of children with behavior or emotional disorders is their desire to control people and objects in their environment. Step by step explanations should be given to these children so that they know what to expect. For example, telling the children that a new activity will begin in two minutes or when they have taken two more turns, allows them to prepare for transitions. Activities should be structured so that children have limited control during the computer session. For example, a child should be given a choice between two (rather than six) options. This would provide ample opportunity for control.

Source: Trieschmann, M. & Lerner, J. W. (1990). *Using the Computer to Teach Children with Special Needs: A guidebook of effective computer strategies.* Evanston, IL: National Lekotek Center.

LEVEL: ADMINISTRATOR

GOAL: #4 Explore how application of computers and peripherals can be successfully integrated within a curriculum for young children with special needs.

COMPETENCY TYPE: SKILL

OBJECTIVE: Participants will use an early childhood software program and utilize appropriate steps to identify ways it could be used to meet a child's needs within a preschool curriculum.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
1. Large group activity Using the Transparency/Handout provided, go over the steps for *Integrating Computer Activity within the Early Childhood Curriculum:* a. Determine the child's specific goals. b. Preview and select software to meet goals. c. Select appropriate peripherals for computer input and possible speech or print output. d. Experiment with software to discover the variety of ways that it can be used. e. Define prerequisite skills for operating software and hardware. f. Plan both "pre" and "post" off-computer classroom activities to: (1) prepare for computer activity; and (2) reinforce skills gained through computer activity. g. Evaluate effectiveness of computer activity on an ongoing basis and modify as necessary.	1. Transparency/Handout (A-T4, A-H20) *Integrating Computer Activity within the Early Childhood Curriculum* Leader Notes (A-L8, 9, 10, and 11) *Integrating Computers into the Curriculum* *Computers in Preschool Classrooms* *The Learning Environment* *The Process of Integrating Software into the Special Education Curriculum*	1. For additional information on these concepts, see Leader Notes A-L8 and 9. *The Process of Integrating Software into the Special Education Curriculum* (A-L11). (This article provides a highly comprehensive analysis of integration into curriculum. It is included to give the leader a solid base of knowledge for reference purposes, but is not intended for direct use within this module.) In discussing the determination of goals at the beginning of the process, be sure to emphasize that the software should always be chosen based on the child's needs — not the reverse. Goals should never be developed for a child based only on available software.
Leader may elaborate on the wide range of goals which may be developed through use of the computer. Handout A-H21, *Why Use a Computer* may be passed out and discussed briefly to coincide with Step 1 in the integration process.	Handout (A-H21) *Why Use a Computer*	

LEVEL: ADMINISTRATOR *(continued)*

GOAL: **#4** Explore how application of computers and peripherals can be successfully integrated within a curriculum for young children with special needs.

COMPETENCY TYPE: SKILL *(continued)*

OBJECTIVE: Participants will use an early childhood software program and utilize appropriate steps to identify ways it could be used to meet a child's needs within a preschool curriculum.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
2. Individual or small group activity Participants should work at computer stations, operating software which has been loaded. If multiple computers are not available, participants can take turns operating one computer and demonstrating programs.	2. Select two to three early childhood software programs available from your local SERRC library. Some common titles are: *Creature Chorus* *Early Learning* *McGee* *Katie's Farm* *Buddy's Body*	
3. Large group activity Ask participants to cease working at their computers. Lead a discussion which generally illustrates how these selected program(s) could be used within the above process. Using the Transparency as a guide, ask for specific suggestions for each step.	3. Transparency (A-T4) *Integrating Computer Activity within the Early Childhood Curriculum* (from previous activity)	3. *Be sure to spend ample time with your selected software in order to have ideas prepared for this discussion!* Appropriate kinds of ideas may be generated from the ACTT Computer Curriculum Activities (Handouts A-H14-19) as well as *Integrating Computers into the Curriculum* and/or *Computers in Preschool Classrooms* (A-L8 and 9.

A-T4

INTEGRATING COMPUTER ACTIVITY WITHIN THE EARLY CHILDHOOD CURRICULUM

1. Determine the child's specific goals.
2. Preview and select software to meet goals.
3. Select appropriate peripherals for computer input and possible speech or print output.
4. Experiment with software to discover the variety of ways it can be used.
5. Define prerequisite skills for operating software and hardware.
6. Plan both "pre" and "post" off-computer classroom activities to: (a) prepare for computer activity; and (b) reinforce skills gained through computer activity.
7. Evaluate effectiveness of computer activity on an ongoing basis and modify as necessary.

A-H20

INTEGRATING COMPUTER ACTIVITY WITHIN THE EARLY CHILDHOOD CURRICULUM

1. Determine the child's specific goals.
2. Preview and select software to meet goals.
3. Select appropriate peripherals for computer input and possible speech or print output.
4. Experiment with software to discover the variety of ways it can be used.
5. Define prerequisite skills for operating software and hardware.
6. Plan both "pre" and "post" off-computer classroom activities to: (a) prepare for computer activity; and (b) reinforce skills gained through computer activity.
7. Evaluate effectiveness of computer activity on an ongoing basis and modify as necessary.

PART II

INTEGRATING COMPUTERS INTO THE CURRICULUM

One of the major reasons that computers are not fully utilized in special education classrooms is that the computer activities are not integrated into the school curriculum. Teachers often view the computer as something apart from their regular instruction. Consequently, while children enjoy using the computer, it is used often as a reward or as a free time activity instead of an integral part of the curriculum.

Research shows that the software available to teachers often does not meet the application needs of the school, the teacher, or the child (Panyan, Hummel, & Jackson, 1988). Many teachers do not have adequate access to quality software programs, enough training on how to utilize computers and software in their classrooms, or sufficient time and resources to develop appropriate computer activities that match their students' goals and objectives.

There are thousands of quality software programs appropriate for children with disabilities that are available for a wide range of computer systems. These programs need to be molded to the specific needs of the teacher, students, and classroom. The effective incorporation of computers into the classroom is dependent on the teacher's ability to develop computer activities that match the existing curriculum.

In Part II we discuss the integration of computer activities into four curriculum areas:

- **Pre-academic Learning**
- **Language Development**
- **The Writing Process**
- **Problem Solving/Thinking Skills**

Software recommendation and sample lesson plans for each of the four curriculum areas are also provided. The four areas, pre-academic learning, language, writing, and problem solving/thinking skills, are all essential components of the special education curriculum. The use of computers in special education can enhance these areas of curriculum. The use of computers in special education can enhance these areas of instruction and provide teachers and children with new and exciting contexts for learning. Activities recommended for each curriculum area follow the INNOTEK teaching model.

PRE-ACADEMIC LEARNING

Pre-academic refers to the prerequisite skills that children need in order to learn academic subjects. Learning does not suddenly begin when a child reaches age six and enters school. During the preschool years, children engage in the learning process, mastering many skills, and acquiring the knowledge that is needed later for learning. The pre-academic areas of learning include understanding and using language, learning to attend, developing memory skills, and acquiring auditory and visual perceptual skills. Pre-academic skills also include recognizing and naming colors, letter recognition, number concepts, shape recognition, categorizing, and classifying.

Non-handicapped children often acquire pre-academic skills without special intervention before they enter school. Most children with disabilities, however, may need specific considerations to assure that they attain these essential pre-academic skills. The computer is uniquely equipped to assist young children in developing these abilities.

SAMPLE CLASSROOM ACTIVITY (COGNITIVE LEVEL 2—5)

Activity Name: Morning Song "Wash Your Face"

SKILLS

- Visual perception (picture object matching)
- Visual and tactile discrimination
- Expressive language
- Socialization

MAIN OBJECTIVES

- Provide opportunities for children to make choices
- Enhance visual discrimination and matching skills
- Encourage socialization and turntaking
- Encourage expressive language skills
- Enhance tactile discrimination skills

SOFTWARE DESCRIPTION

"Wash Your Face": Publisher, UCLA Early Intervention Program. The "Wash Your Face" program works in conjunction with the PowerPad and includes a picture overlay. The overlay separates the board into five areas that contain pictures representing five verses of the Morning Song. Each area activates the computer and allows the children to select a specific song verse. Once the children have selected a verse, an animated graphic of that verse appears and the computer sings the accompanying song.

PRE-COMPUTER PHASE

PURPOSE

The purpose of this phase is to introduce children to the "Morning Song" and to provide them with opportunities to use props/objects and imitate the actions of the song.

MATERIALS

2 Large toothbrushes

2 Washcloths

2 Combs

2 Plates, forks, and spoons

2 Paper dolls (with shirts, coats, or dresses)

ACTIVITIES

1. Teach children the "Morning Song" and include the physical actions to washing face, brushing teeth, etc.
2. Show children props and objects. Talk about what they are used for. Pass the props/objects around so the children can touch them and talk about their uses.
3. Pass out props/objects to individual children to use during the various verses of the song. When the "brushing teeth" verse is sung ask the children holding toothbrushes to imitate the action.

EVALUATION

The effectiveness of this activity will be evaluated through informal observations made by the teacher of the children's ability to sing the song, recognize objects, follow directions, and imitate actions.

COMPUTER PHASE

PURPOSE

The purpose of this phase is to introduce the children to the PowerPad and computer, to provide the children with opportunities to make choices, to reinforce object/picture matching skills, and to enhance tactile discrimination skills in an interactive environment.

MATERIALS

Software: "Wash Your Face"

"Wash Your Face" overlay

PowerPad

Echo Speech synthesizer

2 Large toothbrushes

2 Washcloths

2 Combs

2 Plates, forks, and spoons

2 Paper dolls (with shirts, coats, or dresses)

Shoe box

ACTIVITIES

1. Select children to come to the computer in groups of three for the activity.
2. Show the PowerPad and overlay. Ask the children to match the props and objects to pictures by placing them on the PowerPad to animate the screen and make the computer sing a specific verse of the song. Do this for each picture.
3. Encourage the children to sing the song with the computer.
4. Ask the children to place the props in a box.
5. Have the children take turns naming a picture, pressing it on the PowerPad, and then finding it in the box by touch alone. If a child selects the object correctly he/she gets a counter. The child with the most counters at the end of the activity is the "morning song" winner for the day.

6. Repeat these activities until all the children have had two to four turns.

NOTE: Alphabet software programs that include graphics and animation can be used for this activity also. Children could match objects to pictures on the computer screen instead of the touch pad.

EVALUATION

The effectiveness of the activities will be evaluated through a series of observations made by the teacher or the children's ability to match pictures to objects, to discriminate between objects using tactile skills, to control the computer by selecting specific pictures on the PowerPad and to take turns and cooperate with other children.

POST-COMPUTER PHASE

PURPOSE

The purpose of this phase is to reinforce object/picture matching, tactile discrimination, and social skills.

MATERIALS

Classroom objects (eraser, ball, scissors, crayon, block, clay, etc.)

Box

Picture/object lotto game

ACTIVITIES

1. Gather a group of classroom objects with various textures and shapes. Place the objects in a box. Do not let the children see the objects.
2. Give the children descriptive verbal clues for a specific object: "It is soft and squishy."
3. Choose one child from the group to find the object by feeling all the objects in the box. Children name the object/s that the child pulls out.
4. Provide children with additional activities that encourage object/picture matching (lotto, memory).

EVALUATION

The effectiveness of the activities will be evaluated through observations made by the teacher of the children's ability to use their tactile discrimination and object/picture matching skills. The teacher will also observe the children's ability to take turns and cooperate.

Source: Trieschmann, M. & Lerner, J. W. (1990). *Using the Computer to Teach Children with Special Needs: A guidebook of effective computer strategies.* Evanston, IL: National Lekotek Center.

COMPUTERS IN PRESCHOOL CLASSROOMS

OVERVIEW: This session provides curriculum strategies for using the computer in an integrated preschool classroom. The session is divided into two parts. Part one discusses and demonstrates pre- and post-lessons for computer activities. In Part two, the participants synthesize the information.

TIPS TO THE LEADER: This training session is divided into two sections. If time is limited, conclude with Part One. Part Two can be presented at a later date. Part Two can also be expanded. Teachers could develop worksheets for the most frequently used software programs in their preschool setting. Although we chose "Old MacDonald's Farm" for this activity, any other software program could be used. As this module expands concepts presented in Module 19, some of the handouts can be found in that module.

REQUIRED SKILLS: Participants are able to successfully start up a software program.

OBJECTIVES:

Part One: Pre- and post-computer activities

1. To list prerequisite skills necessary to successfully use a software program
2. To develop a pre-computer classroom activity for a preschool software program
3. To list two ways to modify a software program for preschoolers
4. To describe one way to introduce and use a software program with preschoolers
5. To list follow up activities to reinforce concepts presented in a software program

Part Two: Synthesis

6. To plan and develop appropriate activities to integrate software programs into a preschool curriculum

MATERIALS:

Hardware — for leader and each team:
    Apple IIe computer system with color monitor
    Power pad and cable
    Echo Speech Synthesizer

Software — for leader and each team:
    Variety of preschool software
    Old MacDonald's Farm (UCLA/LAUSD)

Handout Packet H-A1:
    H-19-1, Computer Activity Worksheet
    H-19-2, Completed Computer Activity Worksheet

Other Materials:
- Old MacDonald's Farm overlay
- Old MacDonald's Farm overlay cut up into individual pictures
- Related farm animal toys
- Flip chart or chalkboard
- Markers or chalk

KEY POINTS/ ACTIVITIES:

Part one: Pre- and post-computer activities

1. Prerequisite software skills

1a. Explain that many times we see the computer used by teachers as an isolated tool. Often activities and software programs do not relate to the current curriculum. To use the computer as a successful tool to enhance student learning, teachers must integrate computer activities into the curriculum.

1b. Using software with students is similar to using any other curriculum material. There are at least three steps in the teaching sequence; introduction, use, and follow-up or reinforcement.

H-19-1

1c. Distribute *Handout H-19-1, Computer Activities Worksheet*. This worksheet will be used by participants to record pre and post-computer activities during this presentation. Recommend that participants also use it to make relevant notes for future reference.

1d. Start up and use a software program such as "Old MacDonald's Farm". Ask the participants to list and discuss the skills required to run the software program. Guide them to include cognitive and language skills along with pre-computer skills for successful use. Record their responses on a flip chart or chalkboard.

2. Pre-computer classroom activities

2a. Once you have reviewed the software to determine the skills necessary to operate the program successfully, group them according to skill type. Activities need to be developed for each skill to assure that the child has mastered the skill before he can successfully use the software program.

2b. Discuss the need to design a pre-computer activity for a small group session that has goals parallel to the software program. Let participants suggest activities that are appropriate for "Old MacDonald's Farm." Guide the participants through the design by providing a lesson which incorporates like skills in a different format. For example, the use of objects and related pictures pertaining to the subject matter may enhance the understanding of presented concepts. Let the participants record their responses on the worksheet under the first section 'pre-computer' activities.

2c. Demonstrate a lesson that uses the pictures on the overlay, and corresponding toy animals within a lesson on animal sounds. Explain that this related classroom activity helps to assess existing skills of children.

3. Modifying software

3a. Explain that in addition to cognitive skills, one needs to examine the method of input. Children may need assistance in identifying function keys or pictures on an overlay. If using "Old MacDonald's Farm," demonstrate the use of the pictures on the cut up overlay.

3b. In some cases it may be necessary to modify the program or the input method. If the program offers editing options, examine each as to how they pertain to the students' language, cognitive, and motor skills. For example, "Old MacDonald's Farm" can be played on three levels: by exploring the overlay where a press results in that animal appearing on the screen, or by finding the animal that the computer requests or by identifying the animal that makes a particular sound.

3c. Suggest that if you can not modify the program to change the input method, you can create your own 'editing options'.

- When using an exploratory program, a mask showing only 10 letters of the alphabet could be used to limit the field of choices or for review.
- Making a paper overlay is also an easy process.
- Questioning techniques can simplify or challenge lessons.
- The use of alternate input devices via the Adaptive Firmware Card can simplify input for all children. For example, using two switches with the Multiple Switch Box, one as spacebar and one as return, eliminates the need for the standard keyboard.

4. Using computers in classroom activities.

4a. State that when using the computer in the classroom, thought needs to be given as to how the software program will be introduced and used. Educational goals need to be established. In addition, the computer can be used to encourage social skill building.

4b. Discuss ways of using computer activities in a preschool classroom. Some may include:

- Link pre-computer activities to the software program by using the same materials as cues or rewards.
- Encourage turn taking and joint problem solving, suggest that peers must agree before a key is selected.
- Use programs with printing options or the print-it button to make a hard copy of their work to provide reinforcement for follow up activities a copy of the activity to take home.

4c. Let participants suggest ways in which "Old MacDonald's Farm" could be used in the classroom. Have them complete the second section, "Computer Activities," on their worksheet.

5. Follow up activities: Suggestions

5a. Follow up activities can reinforce concepts presented during computer use. Let participants suggest follow up activities for "Old MacDonald's Farm."

H-19-2

5b. Distribute *Handout H-19-2, Completed Computer Activities Worksheet* to each participant. Discuss similarities of the activities on the handout and those just completed by the previous activity. Explain that this is a completed worksheet based on another piece of preschool software. Give them a few minutes to review the contents.

Part Two: Synthesis

6. Designing pre- and post-computer activities

6a. Instruct the participants to select a software program, review it, and use the form to record suggested activities.

6b. Allow time (15 minutes) for the participants to plan and develop appropriate activities that will integrate software programs into the curriculum. Make sure they include:

- assessing prerequisite skills
- developing pre-computer activities
- modifying the software program
- developing ways to introduce and use the software program
- developing follow up activities to reinforce concepts

6c. Reconvene the group. Sharing the results with the other teams would be beneficial for all.

CONCLUSION: This activity discusses perhaps one of the most difficult tasks for any teacher, the integration of software programs into the curriculum. Software programs are just like other curriculum material. Thoughtful planning for their success in the classroom must be addressed. Computer activities are best provided within the context of other classroom activities. Conclude by drawing participants attention to the worksheet. Emphasize the need for the development of pre- and post-computer activities. Field any questions.

REFERENCES: Osterman, G. B., Greig, C. & Kihan, L. (1987). *Sunburst Curriculum Planner.* Pleasantville, NY: Sunburst Communications.

Source: Preschool Integration Through Technology Systems (PITTS), United Cerebral Palsy Association of Western New York, Inc., 4635 Union Rd., Buffalo, NY 14225; US DOE Grant #H024E80010.

THE LEARNING ENVIRONMENT

The child's degree of success in developing skills on the computer depends to a large extent on the learning environment. Among other things, the learning environment includes the area the computer occupies in the room, the child's position at the equipment, the method of input the child uses for the computer, and the teaching strategies implemented. "The Learning Environment" is devoted to helping you maximize the potential of the computer in your classroom.

This chapter is divided into three sections: birth to three, three to five, and severe handicapping conditions. Read each section, even though you may not work with children in each targeted area. Many suggestions in the birth to three section will be pertinent for older children functioning at lower levels. Some general recommendations which apply to all children have not been repeated in each section to avoid redundancy. For example, care and storage of equipment is discussed in detail in the section on the child with severe disabilities, but the suggestions apply for equipment used with all children.

Equipment Recommendations

Certain pieces of equipment can greatly improve the effectiveness of the computer station. Suggestions for children with severe or multiple disabilities are indicated. The following is certainly not inclusive, but serves as a good starting point.

1. **Computer cart on wheels:** For most children who use wheelchairs, a "standard" computer cart can be used to provide eye level placement for the monitor since many have adjusting table and shelf height. Depending on the size of the wheelchair, the top shelf of the cart may need to be removed entirely.
2. **Smaller table with chair:** Ambulatory children may need a different size table for appropriate computer/monitor placement. Their feet should touch the floor comfortably when they are using the computer. If the keyboard is not used, an input device and the monitor may be placed on the table without the keyboard to reduce extra stimuli.
3. **Surge protector:** Many schools are located in older buildings which have non-grounded plugs. Some schools may have three-pronged outlets without correct grounding. To protect the equipment from electrical damage, purchase a surge protector. Price range from $10 to over $100 depending on customized features.
4. **Power strip:** Some power strips will protect the equipment from electrical surges as well as provide additional outlets.
5. **Disk storage box:** A twenty-five to fifty disk storage box will provide adequate space for the software which can be organized a number of ways within the file depending on the computer expertise of the staff. Disks may be arranged according to which children use them. This way, the staff can simply look for a child's name, select the program, and use it with little assistance. If the staff is fairly new to computer use with children, put a "cheat sheet" in the software box with the program which includes a list of the peripherals required, an outline of the instructions for use, and specific teaching instructions or applications for each individual child. You could also reduce pictures of the input devices and the keyboard on the photocopy machine and copy them on a full sheet adhesive label. Cut out the appropriate pictures and use them as icons on the disk envelope. If the keyboard is used, color appropriate keys on the keyboard icon which operate the program.

6. **Dot matrix printer:** Most dot matrix printers print both graphics and text. The Image Writer II is capable of printing in color. Children who do not have the motor capability to draw on paper can use drawing programs and print their drawings to take home. Children using augmentative communication programs can write short notes to family members (depending on the software used). Teachers can write IEP's, design calendars and newsletters, and use the computer for other record keeping tasks. Record keeping software with a hard copy print out option can provide useful documentation for measuring skill mastery.
7. **Various adaptive plugs and jacks:** Some simple circuit devices to consider for classroom use are: (1) a switch extender (a length of wire to allow a child with physical disabilities to reach the interface box with relative ease), (2) double plugs to one jack adaptor (allows the child to operate two devices with a single switch press), and (3) double jacks to one plug (allows two children to operate the same toy or computer program).
8. **Switch interface:** Several companies make switch interface boxes which enable single switch users to use the computer without the keyboard. Note that the software must also be written specifically for single switch use or operate with the Open/Closed Apple keys (on the Apple IIGS, the Open Apple/Option keys). An Adaptive Firmware Card, versatile for single switch access, may be a consideration if most of the children in the classroom are single switch users.
9. **Clamps, tape, or other securing devices:** The keyboard, switch, or other input device should be placed in a secure manner, be stable, and not hamper or distract the child from his objective.

THE CHILD: BIRTH TO THREE

Environment plays an important role in the outcome of a curriculum activity for the very young child with special needs. Factors which can affect his level of response include switch type and placement, body position, location of the monitor or toy, room lighting, acoustics, and distractions. Input from parents and support professionals, such as physical therapists, vision and hearing specialists, occupational therapists, speech/language specialists, and physicians is essential in the consideration of environmental factors.

Child Positioning

The position of the child's body and the placement of the equipment are the two most critical factors affecting the level and duration of the child's response. Without proper positioning and placement, children are unable to initiate control over any aspect of their environment. Early sensory perception and cognitive development are affected by the child's position. Input from a physical therapist is essential in determining whether the child needs to be placed prone over a roll on the floor, in a chair, or in another position. Infants and toddlers have a strong need for stability and predictability in their environments. The consistency, comfort, and stability of their positions should allow them to concentrate on the activity. See the section on "Positioning Strategies" in the "Severe Disabilities" section.

Switch Determination

Determining the appropriate switch type is also an important factor to consider in conjunction with body positioning. To determine the type of switch the child can control with the greatest ease, begin by examining the child's present physical abilities for the most reliable body movements. Because switches vary in design and effort needed to activate them, the child's most reliable movements will be deciding factors as the choice for a switch (ribbon, leaf, tread, plate, or blow, for example) is made. Another factor to consider is the child's current concept of cause and effect. During initial stages of cognitive development, a switch which is activated by the least amount of pressure will help the child begin to realize his own role in causing the result. For more information on switches, see the switch section in this curriculum guide. Refer to Macomb Projects' Microapplication videotape and manual, **Constructing A Battery Interrupter and Tread Switch** for information about constructing inexpensive switches, battery interrupters, switch interfaces, and other connecters.

Placement of Equipment

During initial switch activities with toys, present the switch in a position accessible to the child. When focusing on a single auditory stimulus — music, for example — it may be desirable to place the source of the sound out of the child's visual field, so that s/he concentrates only on the switch. When the switch is pressed, an auditory response is heard without any visual distraction. Choosing what to present in the child's immediate environment depends on his ability to focus on varying amounts of stimuli. For instance, if it is appropriate to present a moving toy to the child, the toy should stay within the child's visual field so that he does not lose track of it and become frustrated.

The switch should be held firmly in place (easily accessible to the child but not activated by the child in his "resting" position). It should not move (shift) when activated by the child.

When using single switch software, present only the monitor and switch in the immediate environment. Because young children love color and colorful software is exciting and attention-grabbing, a color monitor is more effective for them. With a long video cord for the monitor and an extension connection for the switch, the monitor and switch can be moved to a separate area from the keyboard, the disk drives, and the computer. By seeing only the monitor and switch, the child more readily associates the switch press to the response on the monitor and is not confused by such factors as the "reading" light on the disk drive.

This same principle also applies when other peripherals are the focus of the activity. When using the PowerPad™, present the PowerPad™ and the monitor to the child. In a small group activity, center the pad on a low table within reach of all the children with the monitor placed toward the back of the table. Or consider seating the children on the floor and placing the monitor on the floor or on a low table nearby. The PowerPad™ can be passed among the children.

Monitor placement is an important factor whether a switch or the keyboard is being used for a computer activity. The monitor should be placed at a comfortable eye level for the child. If he is required to hold his head back, to look up at the monitor, he will tire quickly and will not be able to perform optimally. When an activity is conducted with a small group of children, consider the height of the monitor in relation to the children's eye level and place equipment so children can concentrate on the activity rather than on their discomfort caused by improper body positioning or equipment placement.

Limiting Room Distractions

Keep the room setting for any activity as familiar and natural as possible. If you are conducting home visits, the parent should help you choose an appropriate location in the home which can be consistently used for the child's activities. It is easy to overlook details like background noises, so if the focus of the activity is auditory stimulus received from a tape recorder, toy, or software program, pay particular attention to the noises in the home. The young child may have difficulty focusing on the source of the sound if he is receiving constant noise from the environment. Even though sounds from a radio or television seem to be a natural part of the environment, overlooked in setting up an activity for the child, these same sounds compete with the auditory stimulus of the activity. When sessions are conducted in a large room, such as a church or community center basement at a center-based program, poor acoustics contribute to noise distractions. It may be difficult for a child to determine the source of the sound when it appears to be surrounding him in a large room. Placing dividers in the room so that the immediate environment is more confined may help him to concentrate on the sensory component of the activity.

When the activity centers on a visual stimulus, consider the amount of visual distractions in the child's immediate environment. To determine what the child is able to see at a certain level, place yourself at the same level as the child. Darken the room slightly on a sunny day by closing the curtains to help the child focus on a lighted toy or to reduce glare on the monitor.

Summary

Obtaining information from the parents and support professionals who work with the child helps ensure an effective environmental design. Consider the child's position, most reliable body movements, resting position, physical abilities, sensory awareness, and level of cognitive development. The parents and professionals who know the child can provide you with information that would take hours of personal observation to gain.

Keep toys, switches, and other equipment in the visual field to a minimum to avoid confusing the child, place equipment with the comfort of the child in mind, and use switches that are easy for the child to operate. Always use a color monitor with a young child since it holds the child's attention more effectively than a monochrome monitor.

Integrating these environmental factors will determine the degree to which a child is able to respond, and controlling these "built in's" will have a great impact on the child's ability to succeed. Through continuous assessment of the child's physical and mental capabilities and of environmental factors, you can provide progressive opportunities to help the child achieve developmental skills.

THE CHILD: THREE TO FIVE

Setting up a learning environment for the preschool child with special needs is an important aspect of organizing a computer activity. **Building ACTTive Futures** uses a problem-solving approach with preschoolers ages three to five to stimulate their general thinking skills. This approach requires careful planning. The ideal environment is arranged so the child discovers ideas and develops theories for ideas on his own; it is organized to allow the child some instant success (a software program, where any key press on the computer elicits a response on the monitor) and then to challenge the child's thinking skills by offering a preselected variety of options.

An introduction to ideas for problem-solving strategies, teaching techniques, and the value of computer and computer-related activities is included in this section.

Physical Considerations

Before you actually begin using the computer in your program, consider the environmental design. The computer center within the classroom should be a safe, pleasant place for children. Whether the computer is in the classroom daily or access is on a rotating basis, the set-up of the equipment requires some planning. To set up the computer center:

1. Place the computer against a wall near an outlet and tape cords securely to the floor to avoid accidents.
2. Use a surge suppressor to protect the computer from voltage surges which can damage hardware and erase memory.
3. Place the computer away from direct sunlight. Floppy disks and computer chips can be damaged by direct sunlight and extremes in temperature.
4. Select a low traffic area for the computer center. This area should be well defined, allowing the teacher to see what is going on, but limiting distractions for the child.
5. Place the computer on a table without a rug beneath it or use carpeting approved for use with computers (containing copper in the backing) to avoid static electricity which can cause your computer or software to operate unpredictably.
6. Place the computer on a low table for the children. Sometimes you will want to place the monitor on the floor.
7. Adjust the height of the monitor to a comfortable angle for the child. This may mean special adjustment for a child in a wheelchair or adaptive seating device.
8. Have an index file close to the computer center for keeping track of the goals being targeted, the level the child is working on in a specific software program, and any adaptive equipment a child requires.
9. Keep software in protective disk envelopes and closable disk containers away from direct sunlight and any type of magnetic field (including fans, motors, and even the monitor).
10. Place the equipment to allow free air circulation around and into the vents on the computer case.

To encourage the children to become familiar with the written words as well as to reinforce the word-object relationship, place the names of the computer parts on each component of the system. Discuss the rules (i.e., no food or drinks at the computer, no dirty hands) for the computer center and for disk handling with the children. Encourage children to draw pictures to illustrate one of the rules or instructions for operating the equipment; then post their pictures in the center. Reminders help foster the child's independent computer use.

Accessibility

Consider the computer as another classroom learning tool. Like books, dress-up clothes, blocks, paint, clay, scissors, and crayons, the computer provides its own impetus for learning. It is not a toy or game to be used for reward or punishment; rather, it is an integral part of the classroom that can provide a means for the young child to manipulate his environment to learn and discover information about his world. To deny a child the use of this equipment because he did not share on the playground or to use it as a reward fosters the view that the computer is an external reinforcer. In addition, using the computer in this manner enables only certain children — those who finish their work — to use this tool. However, it is often the children who do not finish their work who could benefit most from computer use.

Physical Design and Support Materials

Provide an interesting, approachable environment for the children in a defined area in the classroom. Low partitions such as bookshelves offer children using the computer center some limitations from outside distractions but still allow you to see what is going on in the center. Keep materials related to the computer activities on the shelves of the center. Support materials are necessary to allow children to examine in additional ways concepts (such as tallest, more, on top of, etc.) introduced in software programs. Transfer of a concept from two dimensional to three dimensional and back again develops the concept in children's minds. The more experiences the child has with each concept using as many senses as possible, the more concrete the concept becomes to the child.

Include in the computer center items such as paper dolls (make them any size, including life size with the FingerPrint Card and **Paper Dolls** or **Paper Dolls - Dress Me Too**), puzzles (make them using the FingerPrint Card and **Peanuts Picture Puzzlers**), a set of shapes, games (similar to the game board in **The Playroom**), blocks, colored beads, pencils and paper, an Etch-A-Sketch (the overlays developed for Etch-A-Sketch can be adhered to the monitor screen with poster putty and used with LOGO). Do screen dumps of favorite software programs and use these as patterns to reproduce the characters in a flannel board version of the story. As you become familiar with the software programs you are using, you will identify items that the children will find helpful for transferring and generalizing concepts from one experience to another.

Place the computer on a table or cart at the appropriate height for the child with the keyboard slightly higher than the child's elbows. In a mainstreamed classroom, use a table with adjustable legs which allow the table top to be raised or lowered to accommodate a child in a wheelchair. If your class shares a computer with older children, the cart will probably be too high. Move the computer to a child-sized work area so children will be comfortable as they work. Leave at least two chairs at the computer center and encourage children to work together to develop cooperative learning, language, and social skills.

Position the color monitor at eye-level and within reach so children can point to things without verbally expressing themselves in every instance. Consult a physical or occupational therapist regarding proper positioning of a child in a wheelchair or other apparatus and discuss with them possible input devices as alternatives if the child lacks the fine motor control the keyboard requires. If children don't need to access the keys, present them with the monitor and switch only. Move the computer away from the field of vision, but within your reach for easy access in case you need to reboot the program or boot up a different one. A long monitor cord and switch cable will give you the flexibility of putting the computer in one place and the monitor and switch in another.

From time to time, evaluate the computer center, considering the distractions present in and around it. Consider the classroom noise level and traffic paths, factors that can distract the child. You may need to move the computer center to a new location or plan less distracting activities for others working near the computer area. Children in other areas of the room may be distracted by noise from the computer center. Speech synthesis, music, and sound effects may be distracting to a child in the reading center. Consider all these factors when laying out the computer center and rearrange the room accordingly.

Make sure the center is a safe place to work. Are cords and peripherals tucked away when not in use? Is the electrical outlet safe? Are the disks protected in storage containers? Do you have a static electricity problem? What about magnetic fields? Some of these problems will be easier to overcome than others. Take precautions to safeguard both the children and the equipment.

Ways to Introduce the Computer Center

Introducing the new computer center to children can be accomplished in numerous ways. Teachers should point out and label each part of the equipment and explain how each part of the center is to be used; for instance, the computer is used to operate software and the shelves of material may be played with while others are using the computer. Children should assist in generating the rules; how many should be allowed in the computer area at one time, how many should use the software together (with teacher direction), what should happen if someone does not adhere to the rules, etc. When children help to formulate the rules, they are more likely to follow them. Initially the teacher may want to work with small groups in the center to teach operating procedures and to encourage group cooperation which will be needed as children work in pairs or groups of three or four. Other learning centers should be set up while the teacher spends time at the computer center. Children who demonstrate an understanding of how to use the computer or a particular piece of software may be asked in the future to assist other children who need help when they are at the computer without the teacher present. Children sometimes learn some features of the programs more quickly than the teacher.

Even when teachers are restricted to having the computer in their classroom two hours a day, an effective computer learning environment may be developed. The teacher will need to move the equipment from the generally approved "rolling computer cart," but with a little practice this can be done in five minutes or less. Although moving the equipment may be inconvenient, designing the computer learning environment to allow children to take more responsibility for their learning offers opportunities to develop thinking skills which are difficult to teach. Providing computer and related activities in the learning center, open access, and encouraging peer cooperation in small groups provide an impetus for learning for young children.

Organizational Patterns

Utilize computer time in the classroom most effectively by designing computer activities which can best be accomplished in small groups. Although it is tempting to load a computer program and send one child over to operate it because of its structural simplicity, this limits the computer's use to very few children. Using the computer in group situations requires a great amount of initial planning. To facilitate this process, curriculum objectives for the computer can be organized in the same way that other small group activities are organized. First, record each student's IEP (Individualized Education Plan) goals and group those children together whose goals are similar. Then select a program which can effectively help children to develop those skills. Using the computer with small groups of children also requires internal organization. Children should not always work within the same group; changing groups frequently encourages children to socialize more effectively with others. They begin to develop varying cooperative and adaptive social skills which generalize to other areas of the classroom. They learn more from others and begin to develop the understanding that other people don't always feel or think the way they do, a critical concept in the move from egocentrism to altruism. Software which encourages children to work together as a group and not merely take turns should be selected. Turn taking is a basic social skill and for some children may be the best place to start; however, there are many ways to design computer activities which provide children with experience in cooperative problem solving. In addition to individual learning styles, children exhibit a wide variety of background experiences. These experiences greatly enrich any learning activity and encourage group cooperation.

Encourage children to learn from each other by using a "Computer Experts" chart in the computer center. Choose six or seven software programs that children can use during "free time" activity. Make one screen dump for each program and print it out on a full sheet mailing label (use the FingerPrint Card, an ImageWriter II, and a four-color ribbon for best results). To a large, laminated poster board, adhere the screen dumps in a vertical column down the left side. (Any screen dumps you don't want to use at any given time can be stuck to the back of the chart — the laminating allows you to pull them off and reuse them.) Reduce or enlarge photographs of the children on the photocopy machine onto a full sheet mailing label. Cut these out and store them on the back of the chart. When a child becomes proficient at a software program, place his picture in the row to the right of the program's screen dump on the chart. Other children who have difficulties with the program can go to that child for help.

For the teacher, becoming familiar with many different software programs adds a new responsibility, requiring time to look at, review, and design computer curriculum activities. If the district or school only has a few programs to work with, be creative. Change the way the program was intended to be used. Some software, like some library books, contains appropriate content but is poorly presented to preschool children. It is up to you to make it exciting and meaningful! Your own creativity sets the only limitations for using computers with young children.

Problem Solving Strategies and Teaching Techniques

A child with disabilities has few opportunities to take an active role in his learning. Often adults are in control of the learning situation; adults present material and the child responds to it. Using **Building ACTTive Futures** provides children the opportunity to take some control of their learning by setting up environments which encourage experimentation. Your role changes as the child becomes a more active participant in classroom activities. You become the teaching "guide." You drop clues that help children gain an understanding of their effect on the activity, on or off the computer. You do not necessarily evaluate the child's operation of the program as being right or wrong; instead, you describe what the child has done and offer clues for guiding the child in another direction. For instance, if a child is not using the appropriate keys for operating a program, instead of saying, "No, that's not right!" try saying, "You are pressing the spacebar. What would happen if you tried a different key? What are you going to try next?" Many children will be eager to find the responsive one and will try other keys. Some children will continue to press the "unresponsive" key if they get an attention gaining response from the teacher. Describing to the child what he is doing is less threatening than pointing out to him that he is doing something wrong. Be careful to monitor behaviors and praise appropriate ones. Sometimes doing nothing forces the child to take action of his own.

When you begin using this teaching technique, it takes some children a little time before they understand that answers are not going to be provided without some thought on their part. You provide the child with some possible strategies for solving problems and activities that involve logical and sequential thought. Some activities which include this content can be found in the three-five activities section and in the LOGO activities section of this curriculum guide.

When a child asks you a question, respond with a divergent question that requires the child to do some thinking. Try some of these questions to stimulate children's thinking: "How did you make this happen? How can you do that again? What did you want the computer to do instead of this? How do you think you can make it happen your way? Did you find a short cut? If you tried ... and ... and ... then you were very close. How did you know that? What would happen if you ...? Why did you ...? How could you teach Amy how to do this? Tell me about it. What did you do first ... next ... last?" Questions can go on and on.

Questions which encourage the child to predict or estimate outcomes stimulate solution to problem situations. When asked frequently, open-ended questions stimulate the child's thinking and the answers demonstrate the child's thinking. This form of teacher-child interaction encourages viewing the learning approach of each child and helps determine the next appropriate instructional concept.

One teacher relates her approach to children's questions: "I tell the children to ask a friend before they ask me. When they've asked two friends and get no answer, they can come and ask me again, and I will help." This method involves peer interaction, definite thinking, and general processing skills. By using the "Computer Experts Chart" described on previous page, children know which classmates to ask and where to go for help.

Try these hints when working with children and computers:

1. Encourage children to do as much as possible for themselves. Teach them how to insert and remove the disk. Explain to the children when the disk can be removed and when they must wait. Ask, for example, "When you are in a car and you see a red light, what should you do?" Follow up with the question, "What do you think the red light on the disk drive means?" Demonstrate proper disk handling techniques.
2. Use the computer in small groups with software programs that encourage children to work together. Children can learn valuable social skills when encouraged to group problem solve. Research has shown that spontaneous language tends to increase through computer use.
3. Encourage children to help each other. "Ask a friend before you ask me." Assign computer experts for the week. Peer teaching increases on-task behavior and facilitates the acquisition of problem-solving skills, independence, self-esteem.
4. Encourage children to discuss their questions with other children who have used the program. Answer questions with similar questions whenever possible to help children develop metacognition skills and provide a model to help children think through problems and sequence their responses.

Computer and Computer-Related Activities

The learning environment should not be confined to the boundaries of the computer center; it should extend to all areas of the classroom. This is important because many computer-related activities can be done in small groups which need a larger activity area. For example, you will probably provide many computer-related activities for LOGO before actually presenting LOGO at the computer. Activities help children develop concepts about the commands which will be used at the computer and the outcomes to expect. Children develop some skills for predicting and estimating once they understand the function of commands and when to use them.

Computer-related activities encourage the transfer and generalization of skills and concepts, complementing the knowledge gained at the computer. In turn, the computer activities can be used to reinforce concepts taught in another area of the curriculum. Integrating the computer into the preschool special education classroom will take some time. Designing computer and computer-related activities that reinforce skills will help you use the computer as an integral part of the curriculum. Further examples of learning activities are provided in the curriculum activities section. Check the "Computer-Related Activities" provided in each activity for examples.

Provide computer-related activities for children with multiple disabilities as well. Children who are candidates for alternate input or switch control benefit by learning to use a switch with battery-operated toys. Switches and toys can be sent home easily and are enjoyable. Discuss appropriate switch types with parents and a physical therapist. Once the child has an idea of how and when to use the switch, he will be able to use the switch to operate programs at the computer.

Moving from computer-related activities to computer activities does not have to be a major step since some concepts will be easier for the children to understand because of their computer-related activities. When first approaching the computer, the child should experience some fun. Programs that respond to any key press or a single switch press offer an opportunity for instant success. Challenges can be made as children show intent for what they do and understand that they are in control of what the computer is doing.

Although most classrooms have a limited amount of software, experiences at the computer do not have to be the same each time. Be creative! There are many ways that programs can be used other than is specified in the documentation. The programmer has some intentions for how a program should be used, but you can find other uses. Consider a program's use for each individual child since it is rare that a teacher can use a program in the same way with all her students. To facilitate social and communication skills, group children with similar IEP goals together as partners or in a small group for computer activities; then periodically group more experienced children with novice computer children to act as peer tutors.

Summary

Integrating the computer in the classroom can be challenging, but the results of your efforts are so rewarding. Develop your own ideas for creating the computer learning environment in the classroom as you work with the students. Consider some of the ideas presented here for developing a problem-solving approach in your classroom. Try some of the teaching techniques to organize and produce computer and computer-related activities of your own which allow children to participate actively in the learning process. Many of the activities you are now using in your classroom will probably adapt easily to the computer.

THE CHILD: SEVERE DISABILITIES

The computer can provide many positive changes in the lives of children with severe disabilities. Therefore, the importance of the computer learning environment cannot be underestimated. Experimenting and constant re-evaluating are necessary to find the appropriate placement for the computer equipment and the child, but increasing the child's ability to function independently is well worth the effort. Don't allow preconceived concepts of the child's abilities to actually limit the activities you attempt with him on the computer; the child will experience some degree of success once you have found the right combination of equipment, software, and body positioning. This section will discuss factors affecting the child's performance, helpful hints on how to store and care for equipment, equipment recommendations, and teaching strategies.

Physical Considerations

A corner of the room or an area separated from the rest of the room by dividers provides a semi-private center for computer activities. Be sure there is appropriate space for more than one child in a wheelchair to use the computer at a time or for the computer to be placed on the floor for a child to use in various positions. Placing a small table and chair in the computer center will facilitate moving the monitor and keyboard so that an ambulatory child can view the monitor just as comfortably as a child in a wheelchair. The location of outlets in the room will also play a major role in establishing where the computer is placed. Tape electrical cords against the wall or floor, when necessary, to enable wheelchairs to move freely.

Positioning Strategies

Positioning strategies for optimal computer access are extremely important for children with motor disabilities. When first determining the best position for a specific child's computer access, consult with the child's parents and an occupational or physical therapist. If the child is visually impaired, the vision consultant should be part of the team. Some positional aspects to consider are:

1. In which position is the child most comfortable?
2. What is the child's resting position?
3. How long should the child stay in one position at a time?
4. What are the child's most reliable, consistent movements? (They may vary depending on what position the child is in.)

Perception and the ability to integrate motor control with vision or hearing also play an important role in determining the most comfortable, consistent position for the child. For example, merely placing the child at a slant in relation to the monitor may improve his ability to use the input device and maintain his visual attending. Consider these questions:

1. How long can the child visually attend to the monitor?
2. Can the child visually track an item across midline?
3. Can he work with his eyes in midline?
4. How does the child coordinate his eyes and his motor skills? (Does he have to look at his hand to operate the input device? How difficult is it for him to maintain his visual attending while operating the computer?)
5. Does the child rely on his vision or his hearing to operate the computer?

Once the best position is determined for the child, the type of input device or the way the computer will be operated by the child should be addressed. Switches are available in many shapes and sizes and may be adapted for each child's individual needs.

Positioning the Computer

For ambulatory children, positioning is equally as important. Since abilities in a classroom of children with severe disabilities vary greatly, conduct a careful assessment of each individual's needs. Many children who are physically able to utilize the keyboard may find it overstimulating. For these children, alternate input devices might be considered. Some can use joysticks or touch tablets quite effectively; others might need a single switch device. Discrimination between the keys (especially programs which use keys located on opposite sides of the keyboard) may be difficult for some. Adding stickers or small overlays to the keys may be helpful, but stickers may be too distracting; the child may prefer to handle the stickers rather than use them as references. If single switch use is most appropriate, using only the monitor and the switch (without the keyboard) should reduce excessive stimulation. The location of the color monitor should be carefully evaluated — especially if the child is prone to seizures. Observe the child's seizure activity both during computer use and throughout the day to make sure seizures do not increase with computer use. Computers may not be appropriate for all of the children in the classroom.

For children who can use the keyboard, be sure the child can comfortably reach the keys. The keyboard should be a little higher than the child's elbows. If the child rests his hands on the spacebar or bottom keys on the keyboard, try raising his position in the chair or providing support for his wrists.

Once children have learned to use the computer in their "best" position, provide them with "computer time" when they are in different positions (in the prone stander, resting on the floor). Varying access positions provides opportunities for the children to control the computer environment with more freedom.

Appropriate Storage For Hardware and Software

Provide ample storage for all adaptive computer equipment and software where it is easily obtained yet out of the way. Depending on the children's disabilities and the extent to which peripherals are required, a variety of equipment may need to be stored and maintained. Commercial equipment is expensive, and all staff who use it should be trained to care for it properly. Train the entire staff on equipment storage, use, and maintenance before opening a computer center in your classroom. Store each device in a clearly labeled, covered container or closet to prevent dust from settling on it. The correct name of each piece of equipment, its function or purpose, and the names of the children who are using it should be written on a label which can be easily read. The more equipment available for use, the longer it may take to locate, connect, and change the adapted devices to meet the needs of each child who uses the computer. A peripheral cord should be coiled around a piece of cardboard with a rubber band loosely holding it together. Often, cords wrapped directly around a switch are too tight, causing the switch to remain in a constantly pressed "on" position and damaging the switching mechanism. Wipe peripheral devices with a clean damp cloth periodically to clean them and prevent them from sticking. Use keyboard covers when necessary to prevent damage to the keyboard from children who drool. When equipment is sent home with children, provide good modeling for parents by the way that you pack the equipment. In addition, conduct workshops to familiarize parents with the computer equipment so they will feel comfortable using it at home with their children.

Teaching Strategies

The applications the microcomputer holds for children with severe disabilities are flexible and powerful. Not only does it provide a medium which even the most impaired child can manipulate and control, but it also establishes an equalized interaction with others in the environment. The teacher now has a functional way to meet the needs of her students. However, computer equipment alone is not the "magic" that makes a difference for a child with multiple or severe disabilities; rather it is the way the computer is used or applied which determines its effectiveness as a classroom tool.

Software Availability

Software which enables a child with disabilities to make choices, form decisions, develop responsibility for his actions (software provides natural or logical consequences for choices made), and acquire problem-solving strategies which are transferable from one situation to another is ideal for the child who has not been able to experience this form of learning. This software does exist, but is often hard to find. **Software You Can Use in Early Childhood,** published by Project ACTT, contains an annotated listing of software which can be used creatively with young children with disabilities. Programs which help children develop general thinking skills, control over their environment, and equalized play situations are just as likely to be found in software designed for the home market as that for the education or special education market. This software may need to be customized for a child with adaptive input devices, but it does exist. Once again, remember that the effectiveness of a software program relies on the teacher's creative use of it and the supporting computer-related activities.

Group or Individual Work

One feature which makes computer use so flexible is that it may be used effectively with an individual child or with a group of children. In severe and profound classrooms, many curriculum goals are developed for individual instruction. The staff/student ratio is generally very low, which makes this type of delivery system feasible. Using software "one-on-one" (one computer, one teacher, and one child) is often necessary to insure that relevant goals are met. Individual computer sessions can confirm the appropriateness of the targeted goals, facilitate the adapting of program content to meet specialized needs, and allow for accurate documentation of child performance. In addition, the computer is infinitely patient. It does not get frustrated, provide too much assistance, or require the pressure of a personal relationship ("if I make a mistake, I will upset the teacher"), and therefore provides a non-threatening learning environment.

However, using the computer with large or small groups is a very effective way of encouraging the development of social skills. When children spend most of their days interacting primarily with adults on an individual level, they may not develop appropriate social skills. Since most of their day is adult-directed, they have few activities which they control. Learning as a result of their own actions is, therefore, less likely to occur. Competition among children, especially children with special needs, has become an area of controversy. But what about a child who has few opportunities to compete? Self-competition, challenge, and curiosity are all healthy forms of competition. Using the computer in a group can help a young child experience positive forms of competition and develop social strategies based on interaction with other children. Other experiences such as learning to work with another child to accomplish a goal (two children, each with a switch, control one computer program), support another child's efforts as on a team, and for very involved children, being aware that there are other children in the room, can all be functional goals. Opportunities for equalized play with another child are also beneficial. Imagine a child with physical restrictions being able to play an arcade game with a single switch for the first time in his life.

Children should also be given an opportunity to use the computer independently. For many children, initiating an action may be a new experience. Using the computer autonomously can help young children become risk takers. If they do not press their switch (or a key), nothing happens. No one cues them, begs them, or provides them with answers. The relationship is strictly between the computer and the child. If a mistake is made, the machine cues the child and he can correct it by himself. Observing a child using the computer alone can provide new information about him which might be useful in developing educational programming goals.

Whether using computers with an individual child or with a group, teaching strategies regarding the computer may vary from strategies used with other curricular media. Here are some helpful hints:

1. Allow the child to do as much as possible independently.
2. Use both computer and related activities to reinforce similar concepts.
3. If the child uses a switch or device other than the keyboard, encourage him to use it in other activities whenever possible.
4. Allow ample time for the child to respond before prompting. It may take some children longer to react or respond to the computer than to other instructional tools.
5. Know the software peculiarities and capabilities.The more familiar you are with it, the more creative you can become with applications.

6. Know which programs can be used independently by children and which ones require you to be present in order to reinforce the targeted goals.

With so many consultants and support staff involved in determining the best goals for each child, it is crucial that staff be well trained on how to use the computer and on how to integrate the software into the educational goals of each child. All staff who are responsible for carrying out instructional goals should be aware of possible functional computer applications for each child. In this way, the computer can be used as a flexible, functional tool which can provide a young child with a handicap equalized opportunities for interacting with his environment.

Summary

Microcomputer technology provides a new type of prosthesis for children with severe disabilities: a way to speak for nonverbal children, a way to write or draw for the physically impaired, a way to interact and control the environment for a child with multiple disabilities, a way to play with other children in an equalized manner, a way to communicate and participate in communication, a way to help a child develop ownership or responsiblity, and a way for him to participate more fully in life. Using the computer as a tool to develop the strengths of the child provides a scaffolding. Forget what a child cannot do and build from his existing skills and capabilities.

Source: Building ACTTive Futures, ACTT's Curriculum Guide for Young Children and Technology, Macomb Projects, College of Education, Western Illinois University, Macomb, IL 61455.

THE PROCESS OF INTEGRATING SOFTWARE INTO THE SPECIAL EDUCATION CURRICULUM

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Introduction

When considering the effective use of technology, the term *integration* is often used. Indeed, the importance of integrating technology into the curriculum is frequently noted (Hanley, Appell, & Harris, 1988; Morocco & Zorfass, 1988; Panyan, Hummel, & Jackson, 1988; Royeen, 1988; Office of Technology Assessment, 1988). Despite the importance of this goal, integration is increasingly recognized as a complex endeavor.

Perspective Building

Integrating the computer into the classroom is hard work. In contrast, accommodating the computer in the classroom is easy. As a result, classrooms in which the computer has been accommodated are much more common than classrooms in which the computer has been integrated. However, only one method effectively uses technology to enhance learning.

ACCOMMODATING

In the classroom where the computer has been accommodated, students are able to use (syn. play) the computer when they have finished some specified work at their desk. The programs used at the computer are selected by the student. The teacher is satisfied with this arrangement for several reasons: it doesn't require additional planning time, it doesn't require a large software budget, it is motivating for students, and minimal demands are placed on the teacher regarding the skills and knowledge necessary to use the computer in this fashion.

To the casual observer, it is difficult to ascertain that the computer is simply being accommodated since the computer is being used and everyone concerned seems relatively satisfied with the arrangement. A much less costly ($200 vs. $1200) and much more motivational application of technology is the "Nintendo Response." That is, substitute a Nintendo System for the classroom microcomputer system.

Undoubtedly, this scenario is the result of a lack of attention to the integration process rather than a goal achieved by a deliberate and thoughtful plan.

INTEGRATING

The goal of integrating microcomputers into the curriculum is to link software and computer activities with specific instructional objectives in ways that facilitate teaching and learning. Three key concepts assist in operationalizing the goal of integrating software into the curriculum: curriculum correspondence, targets of difficulty, and stages of learning.

Curriculum Correspondence

The principle of *curriculum correspondence* provides an important framework for considering the effective integration of technology into the curriculum. Curriculum correspondence implies that there is a direct link between what the students are working on at their desk and what they do at the computer. Application of the principle of curriculum correspondence results in computer use that is focused, purposeful, manageable, and an enhanced ability for students to master specific instructional objectives.

Targets of Difficulty

Objectives that are especially troublesome for students to master may be referred to as *targets of difficulty* (Pogrow, 1988). These objectives come to mind quickly for experienced teachers because students have difficulty with these objectives day after day (and year after year). Because these objectives may be hard to learn, and perhaps hard to teach, they make suitable targets to consider when planning for the use of technology to enhance teaching and learning.

Stages of Learning

The third key concept to guide the effective integration of technology into the curriculum focuses on the instructional decision-making that a teacher follows in designing instructional experiences to enhance learning. Thus, the stage of learning has considerable implications for the type of software needed to assist students in learning:

Acquisition Stage
(The student will accurately learn a new skill)

Proficiency Stage
(The student will perform a task accurately and rapidly)

Maintenance Stage
(The student will continue to perform the task accurately and rapidly over time, even after formal instruction has been removed)

Generalization Stage
(The student will perform the learned task in new settings and situations)

Adaptation Stage
(The student will modify the learned task to meet their own needs and the demands of varying situations)

(Mindscape, 1988)

Overview

The model that follows was developed as a result of the following perceptions:

- Integration involves more than simply evaluating software (Smith & Vokurka, 1990)
- Considerable time, energy, and resources are necessary to successfully integrate technology into the curriculum
- Not all the tasks involved in integration are necessarily the primary responsibility of the teacher
- A number of stakeholders are involved in the successful integration of technology in special education programs
- Many integration models are based on system change and provide little guidance for motivated individuals to pursue the integration process on a classroom level

Thus, development of a model that described the various tasks involved in integrating software into the special education curriculum would (a) provide a planning guide for interested individuals, (b) serve as a tool for discussing the process among the major stakeholders, and (c) assist in the identification of methods and resources for facilitating the process.

The process outlined in *Figure 1* describes the major tasks involved in selecting, acquiring, implementing, and integrating software into the curriculum. The tasks appear to be generic in the sense that the process is the same regardless of ability level, subject matter, or type of computer. The process is divided into four phases which are comprised of three to four tasks which must be completed in working through the activities of a given phase.

The process is a somewhat linear progression of tasks involved in successfully integrating software into the special education curriculum. It is my impression that the process is recursive. That is, while phase one results in a comprehensive list of software programs which address a specific instructional objective, phases two, three, and four must be repeated with each new software program. Thus, it becomes readily apparent that this process involves a significant commitment of time and effort.

As a reasonable goal, it is suggested that teachers initially work through this process until they have found three to 10 programs which will support the varied needs of their students.

Figure 1

The Integration Process

PHASE 1	PHASE 2	PHASE 3	PHASE 4
SELECTION	ACQUISITION	IMPLEMENTATION	INTEGRATION
Planning Locating Reviewing Deciding	Previewing Evaluating Purchasing	Organizing Teacher Training Student Training	Linking Managing Extending

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THE PROCESS OF INTEGRATING SOFTWARE INTO THE SPECIAL EDUCATION CURRICULUM

Phase 1 SELECTION			
Planning	**Locating**	**Reviewing**	**Deciding**

Overview

The tasks involved in this phase of the integration process focus on planning for the use of software to enhance teaching and learning. These tasks can be completed cooperatively with other colleagues in a school or district in the context of program planning or a curriculum review committee. (In contrast, each of the following phases and tasks will need to be repeated with each program identified.) Upon completion of phase one, teachers will have a comprehensive, prioritized list of programs that support the teaching and learning of a specific instructional objective. This information will then be used to guide the acquisition phase.

TASK: Planning

OVERVIEW: This task challenges special educators to articulate their rationale for using computers and their curriculum priorities. The result will be a clear statement regarding the planned uses of microcomputers in the curriculum which reflects the needs of the students and priorities of the teacher.

MAJOR STAKEHOLDERS: Students, Teachers, Administrators, Teacher Educators, State Department, Researchers, Technology Specialists, Software Publishers, Resource Centers

Key Questions to Address

- Why should students be using computers?
- What instructional goals could be facilitated by using educational software?
- What unique attributes of educational software make it desirable for teaching selected instructional objectives with software instead of using other methods and materials?
- Given a list of topics to be taught using computers, what priorities will be established?
- How many computers (will be/are) available?
- How much time will be available to each student expected to use the computer?
- Will the nature of students' handicapping conditions require special hardware?
- Will special software be required in order to fully utilize special hardware?
- What standards will be used to identify high-quality software?

Implementation Strategies

Planning for the use of technology in the classroom may be conducted in three different formats:

- Program Planning among a group of teachers working with students with similar needs
- Personal Planning by a teacher focusing exclusively on his/her students and classroom
- Student Planning by a teacher that must consider individual special needs

Note the planning forms in the Resource section.

Formalization of the statements and planning guides developed in this task provide an excellent rationale when seeking additional funding for a microcomputer instructional program.

Resources

See Resource Appendix pp. 21-22 for planning guides.

Technology in special education: A guide to district planning. Contact Dr. R. Hunt Riegel, Project ACCESS, 33500 Van Born Road, Wayne, MI 48184; 313/467-1490.

Male, M. (1988). Integrating computer use into IEP goals and objectives. *Special Magic,* Mountain View, CA: Mayfield, pp. 154-164.

Russell, S. (1986). But what are they learning? The dilemma of using microcomputers in special education. *Learning Disability Quarterly,* 9, 100-104.

TASK: Locating

OVERVIEW: The effort involved in this task is focused on conducting software searches to locate programs which can be used to enhance the teaching and learning of an objective. The goal is to produce a comprehensive listing of potential programs for each objective identified.

MAJOR STAKEHOLDERS: Technology Specialists, Software Publishers, Resource Centers

Key Questions to Address

- How do I find the kind of software I need?
- What local resources are available to assist me in locating appropriate software?
- What other resources are available to assist me in this task?

Implementation Strategies

This task acknowledges the fact that if computers are to be used regularly and productively, then one or more of the following options must be used to supply a computer with a steady diet of software:

Sources of Software

- Write your own programs
- Buy commercial programs
- Acquire free public domain programs

The use of programs which allow a teacher to author the instructional content and control other variables within a program are essential tools for the special educator.

Resources

See Resource Appendix pp. 23-26 for Fact Sheet 105, "Resources for Locating Information About Microcomputer Software."

TASK: Reviewing

OVERVIEW: The task of reviewing seeks to use published reviews and personal recommendations to prioritize the list of software programs identified from the software searches. The outcome of this task is a prioritized list which will guide the subsequent tasks.

MAJOR STAKEHOLDERS: Technology Specialists, Software Publishers, Resource Centers

Key Questions to Address

- How can I learn more about a specific program?
- Have any of my colleagues used these programs?
- Are there programs which are highly recommended by others?
- Can I eliminate any programs from further consideration?

Implementation Strategies

Conducting an extensive evaluation and preparing a review is a time-consuming project. This task seeks to use readily available information to assist in prioritizing a list of programs before conducting a personal review.

A positive published review or a glowing personal recommendation cannot guarantee that a program will meet your needs or expectations.

Be aware that the entire process of software review and evaluation has an inherent bias of subjectivity built into it. Thus, what one teacher may consider excellent may be viewed by a second teacher as unacceptable for his/her purposes. Consider the recommendations of others as a probability statement: If they like it, there is a high probability you will also like it. (Note that a high probability is not the same thing as a guarantee!)

Resources

ConnSENSE Bulletin. Published by the Special Education Resource Center, 25 Industrial Park Road, Middletown, CT 06457-1520; 203/486-0172.

Only the best: The discriminating software guide for preschool-grade 12 (1990 Edition). Available from R. R. Bowker, P.O. Box 762, New York, NY 10011; 800/521-8110.

Malouf, D. B., Morariv, T., Coulson, D. E., & Maiden, V. S. (1989). Special education teachers' preferences for sources of software evaluation information. *Journal of Special Education Technology*, 9(3), 144-155.

TASK: Deciding

OVERVIEW: This task utilizes the prioritized list previously developed to decide which programs to personally preview. A decision to preview one, three, or five programs completes the selection phase and moves the process into the task of previewing in the acquisition phase.

MAJOR STAKEHOLDERS: Teachers

Key Questions to Address

- Will the programs I have tentatively identified work on my equipment?
- Based on the information available to me, which program(s) tentatively appear to meet my needs, within my budget?
- How many of the top ranked programs on my list should I preview?

Implementation Strategies

The decisions made here about software are only tentative. Purchasing decisions will be made later after previewing and evaluating one or more programs.

This task marks the beginning of a loop between deciding-previewing-evaluating. The tasks of this loop are ongoing until a suitable program is identified.

THE PROCESS OF INTEGRATING SOFTWARE INTO THE SPECIAL EDUCATION CURRICULUM

Phase 2 ACQUISITION		
Previewing	**Evaluating**	**Purchasing**

Overview

The tasks involved in this phase of the integration process focus on acquiring and personally reviewing software programs for the purpose of assessing whether or not a program will meet the needs and expectations of the teacher and students. Successful evaluation results in a decision to purchase a program and the integration process moves into the integration phase.

TASK: Previewing

OVERVIEW: This task is directed at obtaining a specific software program for the purpose of examining it first-hand, prior to purchasing it, to determine whether or not it will meet one's needs and expectations. This process allows a user to "try out" and "test" a program before actually purchasing it.

MAJOR STAKEHOLDERS: Teachers, Administrators, Software Publishers, Resource Centers

Key Questions to Address

- Do I have all the necessary information to place a preview order?
- What should I know about ordering a program for preview?
- What should I consider if a program can be ordered from more than one source?

Implementation Strategies

Sometimes it is possible to arrange for a vendor to demonstrate a program at your school or during a conference. While this can be exceedingly helpful, reserve time for your personal review.

If a company is unable to arrange for a program to be mailed on preview, inquire whether a free demonstration disk is available.

Resources

Consider the following examples of several preview policies:

MECC — All orders must be pre-paid. 30 day satisfaction guaranteed.

Scholastic — Every product in this catalog can be examined in your school free for 30 days. If you're not satisfied, simply return the software to us in resaleable condition within 30 days and you'll pay absolutely nothing.

Sunburst — Free! 30 day classroom trial.

DLM — Orders from recognized educational institutions may be accompanied by a purchase order and will be billed, net 30 days, to the same address unless otherwise specified.

TASK: Evaluating

OVERVIEW: A formal or informal evaluation is conducted to determine whether or not a program will meet one's needs and expectations and whether or not the program should be purchased.

MAJOR STAKEHOLDERS: Students, Teachers

Key Questions to Address

- Once a program arrives, how do I determine if it is instructionally sound?
- What reactions do my students have to the program?
- How well does the program meet my original objectives and expectations?
- Does the documentation contain useful information to assist me in integrating this program into the curriculum?

Implementation Strategies

Upon receiving a program for preview, give it to a student for 15 minutes. At the end of that time, have the student demonstrate how it works. This "try-out" should give you an indication of the program's ease of use.

Design a student software evaluation form that provides students with an opportunity for writing about their thoughts after a preview experience.

While software evaluation forms can be helpful (see References listed under Resources), consider using them as a guide for what to look at in a program. Remember, evaluation is a subjective process and an evaluation form doesn't make it any less so.

A negative evaluation will require a teacher to re-examine the prioritized software list and continue the loop of deciding-previewing-evaluating until an appropriate program is identified.

Resources

Hagen, D. (1984). Microcomputer resource book for special education. Reston, VA: Reston Publishing.

Taber, F. (1987). Software evaluation and development. In J. D. Lindsey (ed.), *Computers and Exceptional Individuals*. Columbus, OH: Merrill, pp. 249-268.

Test, D. W. (1985). Evaluating educational software for the microcomputer. *Journal of Special Education Technology, 7*(1), 37-46.

TASK: Purchasing

OVERVIEW: This task involves the clerical and administrative aspects of purchasing a program. Upon completion of this task a teacher or district owns a specific program which has been selected to enhance teaching and learning of a specific objective.

MAJOR STAKEHOLDERS: Administrators, Software Publishers

Key Questions to Address

- What factors should be considered in deciding to purchase or return a software program?
- Is it possible (or necessary) to purchase multiple copies or a site license?
- What should I know about the replacement policy?
- How do I become a registered owner?
- How much time will lapse between when a program is ordered and when it will be available for use in the classroom?

Implementation Strategies

One important factor to consider when purchasing a program is whether or not training and technical support will be available after the sale (e.g., purchasing a program locally vs. purchasing it through a mail order company).

THE PROCESS OF INTEGRATING SOFTWARE INTO THE SPECIAL EDUCATION CURRICULUM

Phase 3 IMPLEMENTATION		
Organizing	**Teacher Training**	**Student Training**

Overview

The tasks involved in this phase of the integration process focus on cataloging and processing a newly purchased program and providing teachers and students with the necessary training to fully utilize a program. After teachers and students have a working knowledge of a program, the integration process moves into the final phase: integration.

TASK: Organizing

OVERVIEW: Software which has been purchased for school or classroom use must be inventoried and organized. While this task is clerical in nature, it is essential to the management of a software collection.

MAJOR STAKEHOLDERS: Administrators, Technology Specialists

Key Questions to Address

- Will software be stored in a central collection or will each classroom have its own software collection?
- How do I store my software and the related documentation?
- How can I organize my software collection?
- What can I do to make it easy for my students to use the software in our collection?

Implementation Strategies

Many present software storage and cataloging systems fail to provide teachers with sufficient information by which to determine whether or not a program may be useful to his or her students.

The use of a database to organize information about a software collection allows the information to be formatted in a variety of reports to meet the distinct needs of administrators, teachers, and technology specialists.

The organization of software within the classroom must be clearly understood by students so that little time is wasted looking for a program. Enlist their help in maintaining the organization of the software collection.

Resources

See Resource Appendix p. 27 for an example of a software database and four useful reports which profile the software in meaningful formats for inventory, ready-reference, and instructional decision making.

TASK: Teacher Training

OVERVIEW: This task focuses on providing training to both teachers and staff so that the program's objectives are clearly understood, mechanical operation of the program is mastered, and instructional strategies for using a program are outlined.

MAJOR STAKEHOLDERS: Students, Teachers, Administrators, Teacher Educators, State Department, Researchers, Technology Specialists, Software Publishers, Resource Centers

Key Questions to Address

- What are the major objectives of the program?
- What prerequisite skills and knowledge are required to use the program?
- Have I mastered the mechanics of using the program?
- Will special instructional strategies be required for students to successfully use the program?
- What instructional strategies will facilitate the use of the program?

Implementation Strategies

Unfortunately, the only training available for most educational programs comes in the form of reading the documentation and trying to use the program. This form of self-teaching works well some of the time, but can be particulaly frustrating with a powerful (sny. complex) program. In such cases, it's helpful to find a workshop where you can be trained on how to use the program.

This may be a useful time to return to colleagues and friends if they originally recommended a program. Sometimes the experience shared in a simple demonstration will save hours of frustration.

Software that is very easy to use often means that you don't have to read the manual to begin using a program. In fact, there seems to be an unwritten law: The less I have to use the instructional manual, the more I like the program. Software which incorporates this thinking is easy to use in the classroom (e.g., Print Shop).

Resources

Several companies prepare extremely helpful quick start-up sheets (e.g., Sunburst, Davidson, The Learning Company, Advanced Ideas).

See Resource Appendix pp. 28-29 for an example of a start-up sheet.

TASK: Student Training

OVERVIEW: This task recognizes the need for students to be trained on how to use a program. The goal is for students to be able to find and operate a program so that the time spent at the computer is primarily learning time.

MAJOR STAKEHOLDERS: Students, Teachers

Key Questions to Address

- Have I mastered the mechanics of operating the program?
- Do I have the necessary skills to successfully use the program?
- Can I use the program independently?

Implementation Strategies

Some software programs will include materials to train students on the mechanics and concepts involved in using a program. Needless to say, these programs are preferable to those which require the teacher to create the training materials.

Training that ensures students have a high degree of success in the mechanics of using a program means that students will spend more time with the program's content.

Creating quick start-up sheets, guides of strategies and tips, and summaries of key commands will aid this process. It may be useful to place other references (dictionaries, thesauri, etc.) nearby as well.

Are there other cognitive adaptions which will enhance students' ability to independently and successfully operate a program?

THE PROCESS OF INTEGRATING SOFTWARE INTO THE SPECIAL EDUCATION CURRICULUM

Phase 4 INTEGRATION		
Linking	**Managing**	**Extending**

Overview

The tasks involved in this final phase of the integration process focus on using software in the classroom to enhance teaching and learning. Considerable time and effort has been expended to reach this phase. However, this is the phase where we see the fruits of our labor.

TASK: Linking

OVERVIEW: This task focuses on linking software with specific instructional objectives which are taught throughout the school year. For example, a program about punctuation is most effective when discussing that chapter in the English text — not two weeks later.

MAJOR STAKEHOLDERS: Teachers, Teacher Educators

Key Questions to Address

- When should the program be used so that it corresponds with the existing curriculum?
- How can the program be best used to facilitate learning?
- What activities would be useful both prior and subsequent to a program's use by students?

Implementation Strategies

Use a small planning calendar to record your use of various software programs. At the end of the year, this calendar will provide some overall information about how you used your computer during the year. Next year you can continue to refine your personal integration plan.

Resources

Sales, G. C., Carrier, C. A., & Glenn, A. D. (1986). Evaluating lessons that use computers. *The Computing Teacher, 13*(8), 46-48.

TASK: Managing

OVERVIEW: This task essentially involves managing computer activities within the instructional environment. Whether the computer is in the classroom or in a lab, the teacher manages and facilitates computer use and pre/post-computer instructional activities.

MAJOR STAKEHOLDERS: Students, Teachers, Teacher Educators, Researchers

Key Questions to Address

- How can I provide time for all students to use the program?
- How do I ensure that all students are successfully achieving the objectives of the program?
- What other materials should be made available at the computer?

Implementation Strategies

Phillips (1983) outlines the following management strategies:

Total Class Instruction
Timed-Use Relay
Block-Time Format
Non-Scheduled Format

Dockterman (1989) describes the following models for using the computer one-computer classroom:

Smart Chalkboard
Discussion Generator
Group Activator
Discovery Tool
Teacher Secretary

Resources

Phillips, W. R. (1983). How to manage effectively with twenty-five and one computer. *The Computing Teacher,* March, p. 36.

Dockterman, D. (1989). *Teaching in the one computer classroom.* NY: Harper & Row.

Rieth, H., Bahr, C., Polsgroe, L., Okolo, C., & Eckert, R. (1987). The effects of microcomputers on the secondary special education classroom. *Journal of Special Education Technology, 8*(4), 36-45.

TASK: Extending

OVERVIEW: At this point, teachers have acquired a software program, judged it to be of sufficient quality, learned how to use it, and taught students how to use it. Now what? This task focuses on identifying additional uses of a program in order to maximize the efforts involved in selecting, acquiring, and implementing a program.

MAJOR STAKEHOLDERS: Teachers, Teacher Educators, Researchers, Technology Specialists, Software Publishers, Resource Centers

Key Questions to Address

- How can I extend the shelf life of a program? That is, how can I continue to use a program in ways that facilitate other instructional objectives?
- When would be an appropriate time to reschedule the use of a program as a probe for the maintenance of skills?

Implementation Strategies

Be on the lookout for creative ideas from your colleagues, at professional meetings, and in your professional literature. Also, if you use software from any of the following companies, you might want to contact them to receive their newsletters. Each issue contains ideas from other teachers on how they use specific programs:

Mindscape
Sunburst
Teacher Support
Tom Snyder

Resources

1988 Special Education Lesson Plan Contest. Computer Learning Foundation, P.O. Box 60400, Palo Alto, CA 94306-0400.

National Unicorn User's Group, 6331 Fairmount Avenue, Suite 332, El Cerrito, CA 94530; 415/528-0674.

Wedman, J. F. (1986). Making software more useful. *The Computing Teacher, 14*(3), 11-14.

A-L11

SOFTWARE INTEGRATION PLANNING FORM

Teacher's Name ______________________________ Date ___________

Number	Curriculum Area	Major Objectives	Program Name (Publisher)
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

PROGRAM PLANNING

Instructional Goal:

Objectives:

Strategies:

Software Required to Support the Plan:

STUDENT PLANNING FORM

Curriculum Area	Goals	Hardware Requirements	Software in Existing Collection	Potential Software to Review
	1.			
	2.			
	3.			

RESOURCES FOR LOCATING INFORMATION ABOUT MICROCOMPUTER SOFTWARE

Fact Sheet 105

Looking for new software to use in your classroom? However …

> "… I don't have a lot of time to prepare my software purchase order."
>
> "… I don't have much money for software, so I want to be sure I spend it wisely."
>
> "… The last time I bought software programs I ordered them based on the catalog description. When the programs arrived, they were hardly like the original descriptions. Now they just sit on the shelf."

If any of these statements sound familiar, you'll find this fact sheet useful for identifying a variety of resources which will assist you in locating appropriate microcomputer software. This fact sheet is organized around seven sections:

1. Comprehensive Resources
2. Focusing the Search to Find a Few Good Programs
3. Software Which Corresponds to the Curriculum
4. Special Needs Software
5. Sources of Public Domain Software
6. Periodicals Which Monitor New Software
7. Other Information Sources

Except where noted, all resources include software information for common microcomputers. The prices do not include shipping and handling.

1. Comprehensive Resources

The first type of resource to consider when looking for software is a comprehensive reference. These sources provide detailed information on programs in a variety of subject areas and grade levels.

> The Educational Software Selector (TESS), 1986-87 (3rd edition), $59.95 and The 1988 Supplement, $29.95.
> *Available from: EPIE, P.O. Box 839, Water Mill, NY 11976; 516/283-4922*

The 3rd Edition of TESS contains detailed descriptions of over 7,700 programs for all types of microcomputers and subject areas. When possible, evaluation information from published reviews is included.

The 1988 supplement describes an additional 3,000 programs and includes a list of 350 highly rated software programs. Multiple indexes make these sources easy to use.

> Software for the Schools 1987-88, A Comprehensive Directory of Educational Software Grades Pre-K through 12, $49.95.
> *Available from: R. R. Bowker, P.O. Box 762, New York, NY 10011; 800/521-8110*

This book is in its first edition and is similar in function to TESS. Indexes are available by computer and subject area. Programs are listed in alphabetical order, and include information on price and publisher, each with a brief description. The hard cover makes it easier to handle than TESS, but TESS wins out when you need a complete description of a program.

2. Focusing the Search to Find a Few Good Programs

One of the drawbacks of a comprehensive software reference is that it quickly becomes apparent how many choices one may have. It is also difficult to ascertain the qualitative differences between so many programs. Hence, several tools have been developed to focus your attention on a few good programs worthy of your attention.

Only the Best: The Discriminating Software Guide for Preschool-Grade 12 (1990 Edition), $26.95.
Available from: R. R. Bowker, P.O. Box 762, New York, NY 10011; 800/521-8110

The editors compiled their software lists based on the results of published educational reviews of software. Programs which emerge from these national reviews with the highest possible score by three or more reviewers qualify as "Only the Best." (A list of "Nearly the Best" is also included.)

A cumulative edition, "Only the Best. The Cumulative Guide to the Highest Rated Educational Software, 1985-1989, Pre-School to Grade 12" is also available from R. R. Bowker for $49.95.

1989 Survey of Early Childhood Software, $19.95.
Available from: High/Scope Press, 600 N. River Street, Ypsilanti, MI 48198; 313/485-2000

Here is a tool that could be considered a blending of TESS and Only the Best, specifically for teachers of young children. Contains complete descriptions of 355 programs and evaluative information on software for Apple, IBM, Commodore, Macintosh, and Atari. Published annually. This resource is a "must" for early childhood teachers.

3. Software Which Corresponds to the Curriculum

Effective use of computers implies that software corresponds to the curriculum. By beginning with a specific objective, the software search is focused, and the program ultimately selected will facilitate students' learning a particular objective.

Apple Access Curriculum Software Guides, $27.00 each.
- K-12 Science
- K-6 Mathematics
- 6-12 Mathematics
- K-6 Reading, Writing, Language Arts
- 6-12 Reading, Writing, Language Arts
- K-12 Social Studies

Apple Education Solution Guides, $24.00 each.
- English as a Second Language
- Foreign Language
- Business Education

Available through local Apple Dealers

These publications focus specifically on Apple software, but are particularly valuable to subject area teachers as well as special educators. Consider purchasing the appropriate guide when your district reviews each curricular area.

IBM Directory of Educational Objectives and Networkable Software for K through Eight in Language Arts, Reading, and Math (June 1989).
Available free through authorized IBM educational representatives

This booklet provides scope and sequence charts which link curricular objectives in language arts, reading, and mathematics to commercial software programs made by IBM and other vendors. One drawback to this tool is that detailed descriptions of the programs have been left out.

Macintosh Educational Software Guide 1990, free
Available from: Apple Computer, Inc., 20525 Mariani Avenue, Cupertino, CA 95014; 408/996-1010

The first edition of a book that provides scope and sequence charts which link curricular objectives in computer science, early learning, language arts, mathematics, science, social studies with commercial Macintosh educational software.

4. Special Needs Software

While the use of off-the-shelf software is desirable when possible, special software is often necessary for (a) teaching concepts not usually found in the mainstream curriculum (e.g., cause and effect, sign language); (b) taking advantage of adaptive equipment (e.g., switch, speech synthesizer); or (c) students' cognitive abilities. The following resources are useful in locating software designed specifically for special education.

Closing the Gap 1990 Resource Guide, $14.00.
Available from: Closing the Gap, P.O. Box 68, Henderson, MN 56044; 612/248-3294

This is a comprehensive guide to the field of technology applications in special education. Published each February, this guide includes sections that address hardware, software, resources, and organizations. Annual subscription includes resource guide, and five other issues for $21.00.

Apple Office of Special Education. (1990). Apple Computer Resources in Special Education and Rehabilitation, $19.95.
Available from: DLM, P.O. Box 4000, One DLM Park, Allen, TX 75002; 800/527-4747

An invaluable reference to Apple-related hardware adaptations, software, and information sources relating to the use of technology by individuals with disabilities using Apple computers.

Trace Resource Book: Assistive Technologies for Communication, Control and Computer Access, 1989-90 Edition, $49.00.
Available from: Trace Research & Development Center on Communication, Control & Computer Access for Disabled Individuals, S-151 Waisman Center, University of Wisconsin-Madison, 1500 Highland Avenue, Madison, WI 53705

This single edition (789 pages) updates a previously issued four-volume series on communication aids, switches and environmental controls, and hardware and software. This is an authoritative reference to adaptive hardware and special needs software.

The 1989-90 INNOTEK Software Resource Guide: A Guide for Selecting Software for Children with Special Needs, $20.00.
Available from: National Lekotek Center, 2100 Ridge Avenue, Evanston, IL 60204; 708/328-0001

This new resource guide contains information on 190 carefully selected programs which have been used in INNOTEK programs with children with special needs, ages two to 14 years. Includes important information on each program's compatibility with adaptive devices. This is an excellent resource.

The Special Ware Directory, 2nd Edition, $22.50.
Available from: Onyx Press, North Central at Encanto, Phoenix, AZ 85004

While this book was published in 1986, it is still helpful in locating older software for special needs individuals. Software is indexed by handicapping condition, type of computer, and subject areas.

5. Sources of Public Domain Software

Public Domain software is a good value for the price. While there is no shortage of sources of public domain software, considerable time and energy may be required to review and select programs which have educational value. The following vendors have expressed interest in identifying and disseminating low cost educational software.

A Source of Apple Public Domain Software

CUE Softswap
P.O. Box 271704
Concord, CA 94527
415/685-7289

A Source of IBM Public Domain Software

PC-SIG, Inc.
1030 E. Duane Avenue, Suite D
Sunnyvale, CA 94086
800/245-6717

A Source of Macintosh Public Domain Software

EDUCORP
531 Stevens Avenue, #B
Solana Beach, CA 92075
800/843-9497

6. Periodicals Which Monitor New Software

One inherent problem with software reference tools is that they are unable to monitor new software developments to produce them. Thus, it is important to regularly review selected periodicals to stay informed of new developments, programs, etc. Some periodicals that special educators find useful include:

Apple II
inCider
Apple II GS Buyers Guide

IBM
PC Computing
PC Magazine

Macintosh
Mac User
Mac World

General
Classroom Computer Learning
Teaching and Computers
The Computing Teacher

7. Other Information Sources

Colleagues, professional journals, computer user groups, and local computer stores are examples of the vast number of other resources which can provide information on software. Finally, for those with access to telecommunications, Apple can be contacted via SpecialNet (user name APPLE.OSEP) or via AppleLink. IBM can also be contacted via SpecialNet (user name IBM.LINK) or by phone at the National Support Center for Persons with Disabilities (800/IBM-2133) or the IBM/Special Needs Exchange (703/439-1492).

This fact sheet was written by Dave L. Edyburn, Ph.D., as part of the ongoing efforts of the Missouri Technology Center for Special Education to provide special educators with pertinent information regarding technology and its application for students in special education. The Missouri Technology Center for Special Education, located in the School of Education at the University of Missouri-Kansas City, is a state-wide technology support project funded by the Department of Elementary and Secondary Education, Division of Special Education.

Technology Center for Special Education, University of Missouri-Kansas City, School of Education, Room 24, Kansas City, MO 64110-2499, 800/872-7066, 816/276-1040, SpecialNet User Name: MOUMKC.

WHY USE A COMPUTER?

Once the decision has been made that a particular individual could use a computer, there is one more thing to be considered before the computer gets turned on. This is the step of goal setting. Is the student using the computer to increase understanding of the world by using cause and effect in more advanced ways? Is the student going to use the computer to learn traditional school subjects? Is the student going to use the computer as a tool for writing or some other form of communication? Is the student going to use the computer for recreational use, possibly with a peer? Or is the student going to use the computer as a practice and evaluation instrument to determine whether some other kind of high-tech device would be useful?

The educational team should work to set goals for computer use just as the team decides on language and self help goals. Below are some of the areas for which computer goals for a young student might be developed.

COMMUNICATION GOALS: Computers which talk or give children something to talk about can increase children's skills. Research indicates that use of a computer and speech output in speech therapy increases a child's language skills more than speech therapy which doesn't use a computer. (Laura Meyers, 1985)

PERCEPTUAL GOALS: Visual tracking, figure/ground, and visual memory are examples of skills which can be developed by a young child using a computer.

SOCIAL INTERACTION GOALS: If you can have fun alone with a computer, you can have even **more** fun with a friend. Young children who share computers demonstrate increased sharing and turn taking even when computers are turned off. (Clements, 1985)

FINE MOTOR GOALS: Computers are being used to help students develop skills such as joystick operation and concepts such as directionality. Young children can use keyboards, expanded keyboards, or Touch Windows as well as single switches to increase their hand use skills.

RECREATION GOALS: The computer may be a tool for having fun, too. Many young children with disabilities need outlets for independent play.

CREATIVITY GOALS: The computer may be a drawing tool for a student with immature motor skills. Or it may be an early writing tool when used with word processing.

COGNITIVE GOALS: These may be in areas as simple as learning to respond to a stimulus on cue or as difficult as learning to read, depending on the needs of the individual student. Any student who is able to attend to the computer's visual and auditory output could have cognitive goals for computer use. This is the area we most often think of when we think of computer assisted instruction.

Source: Oregon Technology Access Project, Oregon Department of Education, Division of Special Education. Funded by U.S. Dept. of Education, Office of Special Education and Rehab. Services, Grant #H180A80027.

LEVEL: ADMINISTRATOR

GOAL: **#4** Explore how application of computers and peripherals can be successfully integrated within a curriculum for young children with special needs.

COMPETENCY TYPE: VALUE/ATTITUDE

OBJECTIVE: Participants will appreciate the positive benefits experienced by young children with special needs when computer applications are fully integrated within the early childhood curriculum.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
1. Large group activity Review Handout and ask participants to name the positive benefits young children derive from the computer use. Be sure the following are pointed out: – Children intrinsically seem to have FUN and ENJOY using computers. – They can participate in the same activities as their peers. – Increased language stimulations and opportunities for social interaction. – Gives children unique opportunities for independent control and accomplishment (especially apparent for those with physical limitations). – Computer has lots of patience, never tires of the same activity, is always ready to play, and never yells when a mistake is made! Secondly, ask participants to identify specific advantages for young children with special needs when computer activities (or any technological applications) are integrated within the ongoing curricular goals.	1. Handout (A-H22) *What Computers Can Do*	1. Throughout this objective, leader should emphasize how much young children *enjoy* using the computer, how it *motivates* them to complete tasks, and how children are *rewarded* by the visual/auditory feedback and the intrinsic sense of *autonomy and control* it provides. Point out that *integration of computer activities within the ongoing curriculum provides children with disabilities maximal opportunities for their own full integration within activities with their nondisabled peers.* To the degree that technology is present within their total curricular experience, children with disabilities are provided an avenue through which they can participate to highly significant degrees with their peers and profit from the ongoing curricular program. When technology is treated as an "extra" or utilized only at particular times, children with disabilities are denied the opportunity to participate with their peers and profit from the ongoing curricular program to the greatest extent possible.

"If we focus on what they can do and work with that, then the child can find ways to work around the handicap."

Laura Meyers

WHAT COMPUTERS CAN DO

1. Give children control and independence
2. Give young children a voice
3. Provide an avenue for socialization, sharing, and teamwork
4. Help children develop cognitive skills
5. Provide immediate feedback
6. Remove emotional overlay from difficult tasks
7. Provide a tool for creativity in children with limited cognitive and motor functions.

Source: Oregon Technology Access Project, Oregon Department of Education, Division of Special Education. Funded by U.S. Dept. of Education, Office of Special Education and Rehab. Services, Grant #H180A80027.

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GOAL 5

Technology

LEVEL: ADMINISTRATOR

GOAL: **#5** Gain an overview of augmentative/alternative communication (AAC) system as a means of meeting the needs of young children with severe communication difficulties.

COMPETENCY TYPE: KNOWLEDGE

OBJECTIVE: Participants will learn and discuss specific ways AAC systems assist young children in meeting their communication needs.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
1. Large group activity Show videotape, *Let's Talk.*	1. Check with your local SERRC for a copy of *Let's Talk*. Copies are also available from ORCLISH. Transparency (A-T5) *Definition of AAC*	1. Prior to showing the video, you may want to provide a definition of AAC. Augmentative and alternative communication refers to any approach designed to support, enhance, or augment the communication of individuals who are not independent communicators in all situations. (Beukelamn, Yoder, & Dowden, 1985.) Ask participants to describe how AAC systems were shown in the video to assist children in communicating.
2. Large group activity As appropriate to needs of audience, review key concepts and terminology from the Handout.	2. Handout (A-H23) *Augmentative and Alternative Communication,* Tech Use Guide Series, CEC, July 1990 Leader Notes (A-L12) *Augmentative Communication Devices*	2. Be sure to stress the broad range of systems available - low to high tech, making references to those in video. Emphasize the need for a thorough assessment of individual needs for matching needs to appropriate systems. The importance of an interdisciplinary team approach in all phases of assessment, vocabulary selection, and training for use in various environments should also be highlighted. (NOTE: Further elaboration of these concepts is made available for the leader in Leader Notes A-L12. The leader may wish to use some pages of these notes as Handouts.

A-T5

ONE DEFINITION OF AAC

Augmentative and alternative communication refers to any approach designed to support, enhance, or augment the communication of individuals who are not independent communicators in all situations.

(Beukelamn, Yoder, & Dowden, 1985)

A-H23

TECH USE GUIDE
USING COMPUTER TECHNOLOGY
Center for Special Education Technology

Augmentative and Alternative Communication

Augmentative and alternative communication (AAC) refers to any approach designed to support, enhance, or augment the communication of individuals who are not independent communicators in all situations (Beukelman, Yoder, & Dowden, 1985). Communication augmentation is appropriate for those who experience difficulty with the spoken and/or written forms of expressive communication. It is important to note that an individual's communication system should not be a single device or technique, but rather a collection of techniques, devices, and strategies that can be employed as the communicative situation warrants. Components of this collection include gestures, facial expression, writing, residual speech, signal systems, nonelectronic communication systems of various sizes and complexity, and electronic AAC technology.

Benefiting from AAC Approaches

AAC approaches benefit individuals with severe difficulties in speaking and/or writing. For those whose oral-motor dysfunction is so severe that speech is not intelligible, AAC approaches provide an alternate method of expression. Individuals with limited arm and hand movements can take advantage of alternate access to print capabilities. AAC approaches with spoken output can assist individuals with low vision, and AAC systems with visual display and print capabilities can assist individuals with hearing impairments. AAC approaches may also be beneficial for individuals with cognitive impairments, not only as a means of expressive communication but also as a language learning tool.

"Low Tech" Approaches

There are many AAC approaches that do not involve sophisticated technology. These approaches may be implemented in isolation, but they more often serve as components in a comprehensive AAC intervention.

Signal Systems. These systems permit an individual to call for help, attract attention, and answer simple yes/no questions. Such systems usually consist of a switch and a signal of some type. The switch is placed in proximity to a body part that the user can move easily and reliably. The signal could be a buzzer or chime, or it could be a tape-loop saying "Come here" or "I need help." Some individuals may be able to use the signal for simple coded messages (for example, one buzz means yes, two buzzes means no, three buzzes means I don't know) or for Morse code.

Communication Boards. This term refers to any display containing vocabulary choices from which the user selects a message. Low tech communication boards are those without electronic components. They can be made using a variety of materials, including wood, plexiglass, posterboard, notebooks, and paper. Communication board displays may contain objects, letters and numbers, words, phrases, photographs, or graphic representations. Brandenburg and Vanderheiden (1988) summarized the many factors that must be considered in the design of a communication board. These include:

- The physical technique the individual will use to select message components from the display.
- The types of symbols to be used on the display.
- The vocabulary items to be included.
- The arrangement of vocabulary on the display.
- The interaction strategies that the augmented communicator will use.
- The attitudes and communication styles of the augmented communicator and potential communication partners.

An individual might have a single board that contains letters and numbers and enough words and frequently occurring phrases to meet most of his communication needs. A student might use different mini-boards for different academic subjects or for different settings (playground, mall, Sunday school). Communication boards also serve as a back-up system should the user's electronic system fail.

"High Tech" Approaches

The incorporation of microprocessor technology into AAC systems has made a number of valuable features possible.

Large Vocabulary. Many AAC systems offer vocabulary capacities in excess of 2,000 entries. The challenge for the user is the management of such large vocabularies, because most systems have static displays containing a finite (and relatively small) number of items. Systems such as *Say-it-All II Plus, scanWRITER*, and *VOIS 160* store vocabulary at a number of levels, requiring the user to activate the appropriate level as well as the correct location on the display in order to make a message selection. Users often consult a glossary that lists available vocabulary along with the activations that are required to access each item.

Several approaches have been designed to minimize the memory demands on the user. All of the devices mentioned thus far can accommodate multiple overlays, one corresponding to each memory level. A new device, *The Talking Screen*, offers a dynamic display — the display itself changes, permitting each level to be displayed without any manual changing of overlays. *The Touchtalker with Minspeak* uses multimeaning icons to facilitate access to vocabulary items not visible on the display. The user codes his vocabulary selections with meaningful sequences of pictures, and thus doesn't need to remember a large number of letter or number codes.

Output Displays. Many devices contain LED or LCD areas for display of messages. As the user makes a selection, the words appear in the display. This permits the user to review the message, and serves as a medium for the communication exchange between partners. Many systems also generate hard copy (print on paper), a useful feature when a permanent record of communication is desired.

Speech Output. One of the most significant advances in AAC has been the availability of spoken output. Speech output renders technology accessible to those who cannot read and those with visual impairments. It also makes communication possible in the traditional auditory modality. Some devices, like the *Mini Talking Card Reader*, record short segments of a speaker's voice onto magnetic tape. Devices like the *Wolf* and *Touchtalker* produce synthesized speech, which is created by subjecting text to a set of pronunciation rules.

The appeal of synthesized speech is its flexibility. Any utterance that can be entered as a text string can be produced, resulting in the potential for unlimited vocabulary. The sophistication of speech synthesizers varies, as does the quality of the speech they produce. Generally, research has demonstrated that *Echo, Votrax,* and *Smoothtalker* speech are significantly less intelligible than *DECtalk* speech (Mirenda & Beukelman, 1987).

An alternative to synthesized speech is digitized speech. In this approach, the speech is digitally recorded, modified for storage in the system, and then reconstructed as spoken output. Although this process yields much more natural-sounding speech, it is very memory-intensive. It is also less flexible than synthesized speech because only prerecorded output can be used. Among the AAC systems offering digitized speech capabilities are the *Introtalker, ALLTALK*, and *Parrot.*

Input Modes. Advances in input technology facilitate access to AAC systems for individuals with the most severe motoric limitations: almost any physical movement now can be harnessed to control communication systems. For example, the *P-Switch* can be activated by almost any muscle movement and can be used to control scanning communications systems. *Voicescribe-1000,* a voice input system with a potential 1,000-word vocabulary, can be used by individuals with consistent vocal output who need to access written communication options. *Freewheel* is a cordless device that allows head-pointing and other body motions to be used to access standard software on a personal computer.

Rate Enhancement Techniques. Several AAC systems incorporate features that improve the efficiency of communication for the user. Prediction routines, such as those found in the *Portable Anticipatory Communication Aid* (PACA) and *Equalizer,* learn the word usage frequencies of the user. When the user begins entering a word, the system responds with the most frequently used words beginning with that letter sequence. Abbreviation routines, as found in the *RealVoice*, allow the user to access items in memory using abbreviation. For instance, the system might be programmed to produce "See you later" with the single keystrokes "C-U."

Customizability. Each individual has unique communication needs, and it is important to be able to customize a system to meet those needs. Many systems come with a standard vocabulary, but allow the user or caregiver to program in additional vocabulary as needed. Similarly, most systems offer the consumer the option of customizing overlays to make them appropriate to the user's cognitive and linguistic abilities.

Assessment and Intervention

Every user presents a unique constellation of needs and abilities, and the range of available AAC systems expands yearly. The process of matching user needs to appropriate interventions should involve thorough evaluation and careful consideration of options.

Potential consumers of AAC interventions may demonstrate deficiencies in motor abilities, cognitive abilities, language skills, social/emotional development, and performance of activities of daily living. All of these areas should be evaluated, because AAC intervention will be affected by them and will in turn exert some influence on them. The need for such a comprehensive approach requires that input be derived from a multitude of sources. A team approach is essential, with expertise being shared among parents, potential AAC consumers, teachers, aides, speech/language pathologist, occupational therapists, physical therapists, medical personnel, ophthamologists, audiologists, educational diagnosticians, psychologists, social workers, rehabilitation engineers, and others with pertinent input. Several protocols have been developed to guide the assessment process (see Beukelman, Yorkston, & Dowden, 1985 and Blackstone, Cassatt-James, & Bruskin, 1988).

It should be emphasized that AAC assessment and intervention are not discrete events, but rather components of the process of assisting an individual to reach his or her highest potential. Contrary to popular belief, the process is not completed when a consumer acquires an AAC system. Understanding of AAC has matured in the past decade, and most people now realize that successful communication abilities do not emerge automatically as a function of device acquisition. Communication skills must be taught, with the goal being the achievement of **communicative competence**. Light (1989) defines a competent communicator as one whose communication is functional, adequate, and skilled in regard to the linguistic, operational, social, and strategic aspects of communication. A competent communicator is one whose communication can meet the demands of daily life. The communication does not have to be perfect, because no one is a perfect communicator. Rather, the user should demonstrate an adequate grasp of vocabulary and grammar, adequate operation of the AAC systems, appropriate interaction skills, and the ability to employ compensatory strategies to enhance communicative effectiveness.

Attention should be directed toward all of these abilities during training. Furthermore, training should be provided not only for the augmented communicator, but for the communication partners as well. Caregiver training could almost be considered a prerequisite for success. Without interested, encouraging, skillful partners, many of the augmented communicator's opportunities for learning and practice would be lost. Given the importance of early success to later motivation and effort, it is essential that training be directed at both sides of the communication dyad.

Crucial Intervention Issues

Training Interaction Strategies. So often people with severe expressive communication problems learn to assume a passive role in communication interactions. They get lots of practice responding, but little experience initiating. Thus, AAC intervention must include explicit instruction in interaction behaviors and strategies. AAC consumers must learn that there is no single correct way to interact with all communication partners: The interaction strategies employed should be selected on the basis of the communication task, the setting, and the skills and attitudes of the partner. Consumers must learn how to get attention, introduce topics, negotiate meaning, interrupt, convey emotion, take turns, and resolve communication breakdowns. They need to learn to work with their communication partners to maximize the successful transfer of information. Kraat (1987) provides an excellent overview of this topic.

Promoting Language and Literacy Skills. The lack of language and literacy skills limits an individual's AAC options. Systems based on spelling, or those requiring knowledge of morphological and syntactic conventions, are inaccessible to individuals without sufficient language and literacy skills. Difficulties with these skills often hold students back from academic achievement and prevent adults from performing adequately at the job site. This topic has just recently begun to be addressed in the literature. Blau (1988) suggested a four-phase approach to developing literacy in young children that emphasizes a positive reading experience, development of a sight work vocabulary, an introduction to phonics, and the development of sentence comprehension. Very young children who have had access to a symbol-based communication system may have an inherent understanding of symbolic representation, lessening the difficulty of the transition to the written word.

Children who are nonspeaking do not have the opportunity to practice sound/letter correspondence orally, so interventionists must emphasize these relationships in other ways. Access to an AAC system may provide an individual with his first opportunities to experiment with sound combinations (if the system has voice output) and language manipulation. Cohen (1988) suggests ways in which word processing software developed for the regular education market can facilitate the development of literacy skills.

Vocabulary Selection. An AAC consumer's communicative effectiveness and efficiency can be enhanced if the system provides access to the appropriate vocabulary. There are many techniques that one can use in making vocabulary determinations. In all cases, it is crucial to approach this task in terms of what the consumer wants and needs. Yorkston and her colleagues (1989) described several methods to employ when selecting vocabulary:

Environmental inventories — This approach to vocabulary selection involves a survey of each of the environments in which the AAC consumer interacts to determine the people and objects present and the activities that are likely to occur. From these observations, lists of potential vocabulary items can be generated.

Communication diaries — AAC system vocabulary should be updated frequently to reflect changes in the user's lifestyle and communicative interactions. To facilitate this updating, the consumer can compile a history of communications either by printing and saving all output (if the system has this capability) or by having someone record the communications for a period of time. Analysis of this record will reveal those items used frequently that are not available in the vocabulary.

Vocabulary list review — Another excellent technique is the review of vocabulary lists. It is difficult to generate vocabulary items spontaneously, but much easier to recognize appropriate words on a list. A review of standard lists is also helpful in identifying the structural words essential for grammatically correct utterances. Often these words are overlooked because the focus is on listing words that will expand the content of a user's communication.

Blau (1986) offers some guidelines for evaluating the utility of selected vocabulary. Among her criteria are:

- Can the item be used to code a variety of communicative functions?
- What is the potential for recombination of the item?
- How frequently is the item used, and in what settings?
- How much information is conveyed by the item?
- How high in reinforcement value is the item for the consumer?
- Does the item have potential for peer interaction and play?
- How much interest does the item hold for the consumer?

In determination of vocabulary, as in all aspects of assessment and intervention, the consumer should be involved in the process to the greatest extent possible.

Resources — Organizations

American Speech-Language-Hearing Association. 10801 Rockville Pike, Rockville, MD 20852, 301/897-5700.

Applied Science and Engineering Laboratories. University of Delaware/A. I. duPont Institute, 1600 Rockland Road, Wilmington, DE 19899, 302/651-6830.

RESNA. 1101 Connecticut Avenue NW, Suite 700, Washington, DC 20036, 202/857-1199.

Trace Research and Development Center. S-151 Waisman Center, University of Wisconsin-Madison, 1500 Highland Avenue, Madison, WI 53705, 608/262-6966.

United States Society for Augmentative and Alternative Communication. Judy Montgomery, President, Fountain Valley School District, 17210 Oak Street, Fountain Valley, CA 92708, 714/857-1478.

Resources — Journals/Newsletters

Augmentative and Alternative Communication (journal). Williams & Wilkins, Publisher, 428 E. Preston Street, Baltimore, MD 21202-3933.

Augmentative Communication News (newsletter). Sunset Enterprises, One Surf Way, Suite 215, Monterey, CA 93940, 408/649-3050.

Communication Outlook (newsletter). Artificial Language Laboratory, Michigan State University, 405 Computer Center, East Lansing, MI 48824-1042, 517/353-0870.

Closing the Gap (newspaper). Rt. 2, Box 68, Henderson, MN 56044, 612/248-3294.

Availability Information

Trace Resourcebook: Assistive Technologies for Communication, Control, & Computer Access. Available from the Trace Center, address above.

Wallchart on Commercially-Available Communication Aids. Available from Applied Science and Engineering Laboratories, address above.

Assistive Technology Sourcebook. Available from RESNA, address above.

ABLEDATA (product database). Available from Adaptive Equipment Center, Newington Children's Hospital, 181 East Cedar Street, Newington, CT 06222, 800/344-5405.

Products Mentioned in Text

ALLTALK, FreeWheel, RealVoice. Adaptive Communication Systems, Inc., 354 Hookstown Grade Road, Clinton, PA 15026, 412/264-2288.

Mini Talking Card Reader. Crestwood Company, P.O. Box 04606, Milwaukee, WI 53205, 414/461-9876.

Voicescribe-1000. Dragon Systems, Inc., 55 Chapel Street, Newton, MA 02158, 617/965-5200.

Say-It-All II Plus. Innocomp, 33195 Wagon Wheel, Solon, OH 4439, 216/248-6206.

VOIS 160. Phonic Ear Inc., 250 Camino Alto, Mill Valley, CA 94941, 415/383-4000.

Introtalker, Touchtalker, P-Switch. Prentke Romich Company, 1022 Heyl Road, Wooster, OH 44691, 216/262-1984.

Equalizer, Talking Screen. Words +, Inc., P.O. Box 1229, Lancaster, CA 93535, 805/949-8331.

Parrot, scanWRITER, PACA. Zygo Industries, Inc., P.O. Box 1008, Portland, OR 97207, 503/684-6006.

Readings

Beukelman, D. R. & Yorkston, K. M. (1989). Augmentative and alternative communication application for persons with severe acquired communication disorders: An introduction. *Augmentative and Alternative Communication,* 5, 3-13.

Beukelman, D. R. Yorkston, K. M., & Dowden, P. A. (1985). *Communication augmentation: A casebook of clinical management.* San Diego: College-Hill Press.

Blackstone, S. W. (Ed.). (1986). Augmentative communication: An introduction. Rockville, MD: American Speech-Language-Hearing Association.

Blackstone, S. W., Cassatt-James, E. L., & Bruskin, D. M. (Eds.). (1988). *Augmentative communication: Implementation strategies,* Rockville, MD: American Speech-Language-Hearing Association.

Blau, A. F. (1986). Vocabulary selection in augmentative communication: Where do we begin? In H. Winit (Eds.). *Treating language disorders: For clinicians by clinicians* (pp. 205-234). Baltimore: University Park Press.

Blau, A. F. (1988). Fostering literacy development. In S. W. Blackstone, E. L. Cassatt-James, & D. M. Bruskin (Eds.). *Augmentative communication: Implementation strategies* (pp. 5.6/1-9). Rockville, MD: American Speech-Language-Hearing Association.

Brandenburg, S. & Vanderheiden, G. C. (1988). Communication board design and vocabulary selection. *The vocally impaired: Clinical practice and research* (pp. 84-133). New York: Grune and Stratton.

Cohen, C. G. (1988). Developing writing skills in the classroom through the use of word processing. In S. W. Blackstone, E. L. Cassatt-James, & D. M. Bruskin (Eds.), *Augmentative communication: Implementation strategies* (pp. 5.6/18-21). Rockville, MD: American Speech-Language-Hearing Association.

Kraat, A. W. (1987). *Communication interaction between aid users and natural speakers: An IPCAS study report.* Madison, WI: Trace Research and Development Center.

Light, J. (1989). Toward a definition of communicative competence for individuals using augmentative and alternative communication systems. *Augmentative and Alternative Communication,* 5, 137-144.

Mirenda, P. & Beukelman, D. R. (1987). A comparison of speech synthesis intelligibility with listeners from three age groups. *Augmentative and Alternative Communication,* 3, 120-128.

Mirenda, P. & Mathy-Laikko, P. (1989). Augmentative and alternative communication applications for persons with severe congenital communication disorders: An introduction. *Augmentative and Alternative Communication,* 5, 3-13.

Yorkston, K. M., Honsinger, M. J., Dowden, P. A., & Marriner, N. (1989). Vocabulary selection: A case report. *Augmentative and Alternative Communication,* 5, 101-108.

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- Guide for Parents
- Technology for Work, Home and Leisure
- Computer Access
- Selecting Software
- Speech Technologies
- Preschool Children
- Hearing Impairments
- Computers and Writing
- Computers and Cooperative Learning
- Visual Impairments
- Learning Disabled
- Telecommunication Networks
- Augmentative and Alternative Communication
- Mildly Handicapped

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WHAT IS AUGMENTATIVE AND ALTERNATIVE COMMUNICATION?

The term "augmentative and alternative communication" sounds like a mouthful of words. Professionals in work settings that serve individuals with developmental, physical, or medical disabilities instead often use the term "AAC" to refer to this relatively new way of helping people with certain communication disabilities. AAC involves the use of communication techniques to supplement or to augment one's physical ability to use oral or written communication.

A simple communication board consists of some pictures glued to a piece of poster board; the board is covered by clear contact paper. Several miniboards contain specific vocabulary for a variety of situations. The communication board does not "speak"; someone else is needed to read aloud the message the student wants to send. Some communication devices are electronic and may speak the words or phrase, print out the message on tape or have it appear on an LED (Light Emitting Diode) display.

Other AAC users, because of more extensive physical disabilities, may need to indicate a word choice by activating a switch which is connected to an electronic communication device. Regardless of the degree of disability, most people are capable of operating a switch by either using direct pressure on the switch or by using a minimal motion such as a facial movement to activate it. For example, if a person can spell, only eye movement may be needed to type out messages on a communication aid.

Some people are AAC users but they do not use a physical aid for communication purposes. Instead, they may use their hands for communicating by manual sign language or some other gesture system. Others, particularly those with severe cognitive impairment, may use body movements, such as reaching or pushing something away, as a means of communicating some messages.

Many AAC users will use a variety of ways to communicate. What works best is a highly individualized matter for each person. Some people can't read and need to use pictures; others lack the hand skills to use any sign language. An electronic device may be appropriate for some individuals while others are more effective with a nonelectronic device. AAC options are numerous because the abilities and needs of the various users are very diverse.

An excerpt from *Augmentative/Alternative Communication in Indiana* by Beverly Vicker and Diane Williams, Indiana University, Bloomington, IN.

A-L12

WHO CAN BENEFIT FROM AUGMENTATIVE ALTERNATIVE COMMUNICATION?

Augmentative aids and techniques are appropriate for individuals with varying degrees of physical or cognitive involvement that interfere with effective vocal communication. They are appropriate for individuals of all ages. Augmentative aids can also be used with individuals who can speak, but are unable to write because of sensory or motor impairment. Populations that may benefit include persons with:

A. **Neurological Diseases:**
Amyotrophic Lateral Sclerosis (Lou Gehrig's Disease); Multiple Sclerosis; Muscular Dystrophy; Parkinson's Disease; Huntington's Chorea

B. **Acquired Conditions:**
Head injuries from car, motorcycle, snowmobile accidents; strokes; spinal cord injuries; laryngectomy; glossectomy

C. **Congenital Conditions:**
Cerebral palsy; mental retardation; developmental speech/language disorders; genetic syndromes

D. **Temporary Conditions:**
Guillain-Barre syndrome; Reye's syndrome; post-surgery/trauma (intubation, tracheotomy, respirator)

WHY USE AUGMENTATIVE ALTERNATIVE COMMUNICATION?

Everybody has something to say. Communication is a basic right and necessity. Personal and academic achievement is closely related to the ability to communicate.

An excerpt from *Augmentative Communication: An Introduction* by Sarah W. Blackstone; published by ASHA.

GENERAL INFORMATION AND RESOURCES FOR OBTAINING AUGMENTATIVE COMMUNICATION AIDS

Before seeking funding for a communication device, many preliminary activities take place. A complete, multidisciplinary assessment is recommended by professionals who have been trained in the area of augmentative communication and technology. This team could include but would not be limited to a speech/language pathologist, occupational therapist, educator, psychologist, nurse, vocational counselor, etc. Parents or caregivers should also be included in this team to supply information and evaluate various systems. "Low Tech" or non-electronic options should be considered as well as electronic devices. The intent to communicate must be clearly identified through the assessment process. Seating and positioning must be addressed to insure that the individual is using the most efficient system of accessing the device or system.

Use of several communication systems and/or devices on a trial basis in all settings is highly recommended after the assessment. An inventory of initial vocabulary and phrases from the assessment and observations of the individual in various settings can be individually arranged or programmed on the system/device for the trial period by the speech/language pathologist or other trained professional with team input and involvement.

The team should reconvene to evaluate the effectiveness and appropriateness of each system/device and the access mode. The team should make sure that all appropriate systems/devices are considered or tried by the individual before making a final recommendation. Consideration should be made in regards to future needs and uses. A less costly device may not always allow for flexibility and growth. Since individuals and technology change frequently, upgrading systems will need to be considered periodically depending upon needs.

Assistance with resources to evaluate and assess nonspeaking/nonwriting individuals can be obtained by contacting the educational agency where a child, birth through 22, resides or public centers for medical or vocational rehabilitation, speech/language pathology, etc. The references listed on the following pages of this booklet may be consulted.

Steps to Funding, (May 1991). Ohio Augmentative Communication Problem Solving Consortium.

AUGMENTATIVE COMMUNICATION DEVICES

Carol Suddath and Jackie Susnik

A Product of the Center for Special Education Technology
Operated by The Council for Exceptional Children
Funded by Office of Special Education Programs
U.S. Department of Education

INTRODUCTION

Communication is the sharing of one's needs, feelings, experiences, and ideas through different channels or modes. These modes of communication may be verbal (spoken, through verbal speech or speech output communication aids) or nonverbal (facial expressions, body language and orientation, gestures, and tones). Approximately 35% of what we communicate is verbal and 65% nonverbal. For example, "Honey, come here" may take on different shades of meaning, depending on the accompanying tone, body language, and facial expression of the speaker. Communication may also take a variety of forms, including spoken, written, and artistic (music and art forms).

To interact with others, we must have some understanding of what communication is and what the verbal and nonverbal messages of others mean. Our receptive language involves our ability to "make sense" of the words used by others, so that there is a common frame of reference. For example, when the word "chair" is spoken, both listener and speaker envision a similar picture or referent. Thus, an individual must have sufficient receptive language to be able to produce a message that will be understood. In cases where the overall receptive language is depressed, you should expect that use of communication technologies will be directly related to language competence. In other instances, there may be specific receptive gaps or an inability to transform receptive language into expressive communication, which will restrict or limit the ability to produce all expressive components.

Augmentative/alternative communication (AAC) can help people with both productive and receptive communication disabilities to interact with the world. AAC refers to any technique used to enhance or augment communication. For many years, people have designed and used AAC systems and strategies to communicate with nonspeaking individuals. Some of the methods used have included multiple choice questions, eye blinks, gestures, sign language, communication boards, communication books, alphabet boards, and even primitive Morse Code systems. Recent years have seen the addition of computers and environmental control systems. Most of these systems are still effective and are a part of AAC technology today. One of the most liberating pieces of technology is the voice output communication aid (VOCA).

VOCAs are stand-alone, dedicated electronic devices that produce computer-generated speech. Many VOCAs are available, each with its own distinct features and characteristics to serve the diverse needs of students with communication disabilities. Please bear in mind that, as important as the VOCA may be, it is still only part of the student's communication system. The "big picture" requires that we promote the use of all appropriate communication strategies, both verbal and nonverbal.

We've written this booklet to introduce you to VOCAs. Whether you are a primary user, parent, teacher, or speech therapist, it is designed to give you a "nuts and bolts" description of how, when, and what to expect when using a VOCA in the classroom.

Two things are critical for you to remember as you begin this new endeavor: (1) You already possess a wealth of information and skills in your field; and (2) To effectively implement technology, remember that it is a means to an end, not the end itself. More than once, it has surprised us to find out that competent service providers lose sight of this.

A brief illustration may clarify what we are trying to say. A speech/language therapist was being trained on the programming of a Speech Pac voice output communication aid. During the process, she asked, "Now that the system is operational, what should I work on with this student?" Our reply was simply to ask where she placed his language skills and what would she work on with any student who was at that level. She realized that she had the training to deal effectively with this student, and that she, herself, was quite capable of developing appropriate objectives.

This story is not meant to disregard strategies that are unique to effectively using an augmentative communication system. It is, however, meant to reassure our readers that they have the prerequisites to assist students in developing their communicative potential.

VOCA-related terminology, general training techniques, common problems, and helpful hints are described to help you settle into this unfamiliar territory comfortably. Part 1 of this booklet discusses the essential "people" factors in VOCA use — the educational team and the student. Part 2 provides guidelines for accommodating VOCA users in the classroom and using the device for enhancing their learning. Part 3 explores how students can benefit from VOCA as they go out into the community. Part 4 provides precautions, helpful hints, and a troubleshooting checklist. The appendixes include a glossary, devices and vendors list, resources, and references.

We hope that this booklet will get you started and inspire you to delve further into the opportunities afforded by VOCA technology.

PART 1
THE EDUCATIONAL TEAM AND THE STUDENT

What is the Educational Team?

When a nonspeaking person enters an educational or hospital setting, he or she is evaluated to determine what AAC systems or training options might be appropriate. Individuals involved in this evaluation process might include a speech pathologist, physical therapist or occupational therapist (support staff), medical doctor or nurse, psychologist, engineer, computer technology specialist, teacher, social worker, vocational counselor, parent/direct care giver, and the student. It is important that parents and direct care staff be involved throughout this evaluation process, as well as in the training that follows. This evaluation differs across states and facilities, but the outcome includes recommendations that match the student to the training process and AAC system that best meets his or her individual personality and needs.

If possible, the student should have the opportunity to use the recommended system(s) on a trial basis, before a specific VOCA is purchased. The evaluation process, along with its documentation, is extremely important because there is no single device that is appropriate for all nonspeaking individuals. Attempts should be made to obtain a copy of this evaluation and therapy progress reports, to provide a complete picture of the student's needs and functioning level. Direct contact with members of the evaluation team, educational team, or previous support staff is also recommended. This is particularly important if you experience frustration with use of the VOCA. Although the educational team attempts to make an ideal match between user and device, for a variety of reasons, optimal decisions do not always result. Communication among evaluation team, practitioners, and users facilitates ongoing evaluation and feedback. Thus, if vocabulary revisions are required or if a different device would be deemed more suitable, a decision encompassing all three perspectives can be made.

What Do You Need to Know About the Student?

It has been said that you cannot select a VOCA for anyone until you know that person as an individual — his or her capabilities, limitations, needs, interests, hopes, and aspirations. This axiom makes sense because a VOCA is indeed an extension of the individual's personality.

You need to evaluate the student's abilities, including motor, perceptual, cognitive, social, and communication competence. You need to consider the student's physical and social environments because they are an intrinsic part of communication effectiveness. Educational and vocational goals also need to be addressed in VOCA selection.

As every experienced teacher knows, three issues are crucial to success in acquiring and using a new skill.

- The student must have appropriate opportunities to use the skill. You have to look at the student's daily schedule and determine when and where such opportunities are likely to occur. For example, if you want to encourage dialogue, you need to be aware of relaxed, uninterrupted time segments when conversation might naturally take place.
- You need to know what motivates the student. In some cases it may simply be pleasing the teacher; or it may be that the child wants to be the center of attention; or it may be a tangible reward. In the optimal scenario, the simple act of communicating will be reward enough.

- Take advantage of the student's sense of humor. It's a prime motivator for spontaneous communication and social interaction.

Obviously, you will want to evaluate these areas in some detail. There are numerous assessment tools and checklists available. For example, the INCH assessment tool (see Appendix B) offers some helpful guidelines. (Also, see Appendix C for resources and references.)

PART 2
USING THE VOCA IN THE CLASSROOM

How Do I Introduce VOCA Use to My Class?

The addition of a VOCA user to your classroom will probably result in some unanticipated situations. We would like to suggest the following activities that will facilitate the integration process: (a) an introduction of VOCAs and VOCA users by an informed user; (b) classroom rules, which describe and define how the VOCA will be used and who will be allowed access to it; and (c) determination of places where the VOCA will or will not be used.

The presence of a VOCA in your school will create a great deal of curiosity and interest, and we suggest that you make this a learning experience for all. We recommend that you use a former teacher or parent as a resource because they have already experienced some of the concerns that you will have. You might also enlist other people in your community — perhaps a special education teacher, a speech therapist, or a university professor who has worked with VOCAs — to do a presentation at your school. Suggest that they discuss what VOCAs are, how they work, explain how a student acquires a VOCA, and give examples of how the device sounds. You might contact the vendor to ask is there is a videotape available. Being able to see a VOCA user "in action" often helps to demystify this process. You might also suggest that staff (and students) spend a period of time (30-60 minutes) as a nonspeaking individual, to bring about sensitivity to the impact of this disability.

How Will the VOCA Affect the Classroom?

Having a VOCA user in the classroom will result in many changes, including attitudes, structure, and space. Every VOCA user (just as every one of us) is a unique individual, with varying needs. The VOCA user may require special seating arrangements or methods to secure and access the device. Again, if you're not sure how to deal with wheelchairs or hardware arrangements, go to resources in your school, community, or to vendors and ask questions.

Rather than raising a hand to indicate that he or she wants to participate, the user might activate a buzzer or give eye contact to gain the attention of others. As you get to know the VOCA user, his or her methods may become evident; or you could provide options and jointly determine which will work out best within the school setting. Don't forget to use former teachers and parents as resources.

Every VOCA has different features, some of which may expand classroom performance. Some examples include: the *Light Talker's* ability to act as an alternate keyboard for a computer; the *WOLF's* ability to activate battery-operated toys in conjunction with speech production; the *SpeechPAC's* ability to act as an environmental control interface. Some VOCAs have features that can be adapted for other classroom applications.

Should Other Students Be Allowed to Touch the VOCA?

After your initial introduction, you may continue to have concerns regarding who should be responsible for the VOCA, or have access to it. Often, other student may attempt to help the VOCA user, resulting in several potential problems. First, the user should be consulted and should indicate whether or not he or she would like assistance. Sometimes, in our effort to "help," we may fail to realize that students with disabilities want or need to do things on their own, being as independent as possible in all situations. It's fun to operate a power chair or VOCA, but your other students may need to be reminded that these are tools that belong to and help the student with disabilities participate in classroom activities. On the other hand, nonusers may be engaged to prompt or model communication strategies with the VOCA. This may be an excellent training technique, and may serve to reduce frustration when the VOCA user is confused or exposed to new tasks. It may also help other students learn language, communication, and social concepts.

How Should the VOCA Be Integrated Into the Academic Curricula?

It is impossible to detail training strategies in this booklet, but several sources of sample strategies are available through national and local organizations, such as the American Speech and Hearing Association (ASHA) and the United States Society for Augmentative and Alternative Communication (USSAAC), which present training and curricula (see Appendix C). We suggest that you contact these organizations, explain your needs, and ask if they can provide assistance. What we can offer here is some broad-based suggestions for most classroom VOCA users. It is amazing to contemplate the cognitive processes and skills one can facilitate with a VOCA, such as the following:

- Awareness of cause and effect — simply the push of a switch produces something.
- Comprehending a means to an end and therefore learning to initiate requests. By programming a word for something that the student has demonstrated he or she consistently enjoys, and placing the VOCA in a strategic location for the student to activate, the student can learn that the VOCA is a means to an end; that is, the student activates the sound and gets the desired object.
- Indicating preferences. By programming simple choices of leisure activities or locations in the room, the teacher can encourage the student to self-determine some preferences.
- Participating in songs or nursery rhymes — learning to anticipate "events" that occur in "predictable" rhymes or stories.
- Creative, exploratory play. Children can role-play adult activities, such as talking to dolls or going to the store.
- Conveying messages. Students learn concretely communicative responsibility.
- Participating in "circle" routine activities. Rote skills such as calendar words can be elicited, class jobs chosen, and weather referred to and indicated. The visual reinforcement on overlays, as well as the auditory feedback, assists in the initial learning and retention of these concepts.
- Acquiring and displaying social rituals (courtesies), such as saying "please," "thank you," "hi," "good-bye," and "What's your name?"
- Memorizing series, such as days of the week.
- Organizing information, such as how prepositions and concept words relate to each other by seeing their graphic representation.
- Acquiring sight word recognition.
- Using the device as a "dictionary" reference when spelling.

- Developing a sense of phonics for reading and spelling. Many VOCAs have the ability to phonetically produce sounds from the English language; such a programmed level can be used during spelling, writing, and reading.
- Participating in class performances and skits.

As is apparent from this list, you should approach the VOCA user as you would any other learner in your classroom, except that this student has a machine that facilitates fuller participation. Your focus should not be centered around teaching the student how to use the VOCA, but rather using the device as a learning tool.

We encourage teachers to learn to program VOCAs, enlisting support from previous teachers or therapists, community resources, parents, or direct care givers. Initially, programming a VOCA may be a very intense task, but stay calm and stick with it. As with any other new skill, it simply takes practice and review of the VOCA manuals provided by the manufacturer.

How Does the VOCA Encourage Socialization?

In addition to learning social rituals with the VOCA, students also engage in conversation and humor. It is our experience that these are often learned beyond our expectations — a sort of experiential, incidental learning occurs. It is helpful to program in humorous quips and even jokes or riddles to expedite the process, but the most fun often comes from student "self-communication" strategies. One student, for example, tried flattery to get the teacher to cut a lesson short: he said (with the VOCA), "You are pretty." At the other end of the spectrum, of course, was the boy who put his phonics lessons to quick use by producing letter-by-letter expletives on the bus for the entertainment of all his peers. Another boy, asked to spell the word "fish," tired of demonstrating his spelling prowess, summarily turned to the food page, activated the cell with the food item "fish" on it, grinned, and quickly shut down his machine. One student established his assertiveness during a classroom discussion of the calendar and upcoming events by interjecting, "My birthday is May 3." This was an individual who was not about to be overlooked or forgotten in the "regular" routine of things. All of these instances certainly helped students express their unique personalities.

PART 3
USING THE VOCA IN THE COMMUNITY

A current trend in providing services to people with multiple disabilities is community-based training. Through this approach, these students learn to use their local community services, such as libraries, fast food and other restaurants, grocery stores, and banks. The students also participate in employment opportunities.

As mentioned previously, a VOCA is only one component of the student's entire communication system. When doing community-based training, teachers should be concerned with all aspects of the student's communication, including the following:

- Using language appropriately in social contexts *(pragmatics)*; for example, having the student approach a store clerk and being close enough to be heard before making a selection.
- Being aware of timing in communication *(Chronemics)*; for example, responding promptly in a turn-taking situation.
- Making choices; for example, selecting items from a food menu.

Some community-related skills can be practiced in the classroom, such as the following:

- Personal identification.
- Manipulating money and numbers.
- Transporting and manipulating the VOCA and overlays.
- Efficiently using community-based vocabulary (e.g., names of the burgers at a fast food restaurant, sizes of different food items, and survival words such as "push," "in," and "restrooms").
- Turn-taking — both conversational and physical (e.g., waiting in line at a drinking fountain).

Most skills, however, are best trained in real-life situations where the student experiences all of the steps in the activity. Not only is the isolated skill learned (producing a fast food order), but the student learns the entire activity, including those events that precede and follow this skill which facilitates skill acquisition and generalization. In addition, community-based training reveals other skill areas that need to be addressed, as indicated by the following scenario.

An ambulatory VOCA user was taken to a fast food restaurant. After placing and receiving his food order, he took the food to his seat and left his VOCA on the restaurant counter. This was discussed by the educational team, with the following solution. During subsequent trips to fast food restaurants, the student was prompted to put his food tray on top of his VOCA (which was in a case), carrying both at the same time. This "trial" ended up working well, and there have been no further problems.

Another student had to learn to grasp her food tray with one hand, while carrying her VOCA (by a handle) with the other. A shoulder strap would also be an option for some students. A student in a wheelchair might have to use the VOCA to ask that the food order be placed on his or her lap tray.

As with academic studies, numerous community-based programs and training suggestions are available through national and local agencies. Just ask!

Before conducting community-based training, you should engrave the VOCA with the student's name and social security number and attach a luggage tag that provides a phone number in case it is lost. Satchels and bookbags serve as good cases for VOCAs. The devices do get lost, broken, misplaced, and stolen; and batteries go dead at the most inopportune times. If such mishaps occur, rest assured, it has probably happened to someone else, too.

There may be some environments, such as amusement parks, that are hostile to VOCA use. You should confer with the VOCA user and professionals on the advisability of taking the VOCA to such environments. You may want to make other provisions, such as using activity-specific communication boards or just the overlays of the VOCA. Before such outings, do an environmental inventory (check out the territory) and plan well in advance.

PART 4
PRECAUTIONS AND TROUBLESHOOTING

Helpful Hints and Precautions

Read the Manual

Even if it seems like Greek — try. Familiarity and time will comfort you. Documentation has become more readable because people took the time to read the manuals, and then voiced their frustrations to the vendors and manufacturers. Now manuals usually provide a "guided tour," which walks you through the use of the device. One valuable section is the "troubleshooting" section. This section generally makes no assumptions; it will remind you to do basic things (like check to see if the battery is charged) before you get panicky or before you call the manufacturer. In addition, this section gives you guidelines on how to organize and explain the problems to technicians. Many manufacturers also include teaching strategies that have proved very helpful to some trainers.

Know the Resident Vocabulary

Become familiar with the vocabulary residing on the device. You may not be in charge of determining the original vocabulary, but the user or the parent will know what vocabulary is really used or needed. Your familiarity with the vocabulary and where it is located will allow you to facilitate the student's access; therefore, communication will flow more smoothly.

Gather Information

Solicit information from significant others (family, former teachers, and friends) and from vendors and other people using similar technology. This will help you avoid many pitfalls, develop realistic expectations, provide for transitional use, and increase trust and acceptance levels. Also, share your gained knowledge with others. Teaching is a great way to clarify your thoughts and internalize information. We encourage you to make connections with the following national organizations: Center for Special Education Technology (800/873-8255), American Speech, Language, and Hearing Association (800/638-6868), United States Society of Augmentative and Alternative Communication (c/o ACS) (800/247-3433), and Alliance for Technology Access (415/232-0621).

Find an Expert

Seek out a competent VOCA user to give classroom demonstrations, particularly in the context of a lesson. This is a consistent recommendation of teachers, vendors, and others consulted in the preparation of this booklet.

Have Reasonable Expectations

If students are not allowed to talk out in class, have the same requirement of the VOCA user. If use of the device in a certain setting impedes learning (for example, a student in training to be a dishwasher), recognize that and deal with it. Don't feel guilty about not letting the student use the VOCA in certain situations. You may be better safe than sorry.

Make Backups

Make overlay back-ups in case of spills and losses. Also keep copies of overlays on file for easier revisions.

Avoid Hazards

Be aware of the possible hazards of moisture and static electricity. Avoid water hazards, and ground the user when static seems a likely possibility. The static electricity that people acquire in dry atmospheres can be transmitted to objects they touch (in this case a VOCA) and can cause disruption in current and a malfunction of the system. Grounding yourself on a rubber surface, particularly if you are standing on an unpainted metal surface, is a worthwhile precaution. Another remedy to prevent static discharge when turning on the VOCA is to use an anti-static softener sheet (used in home dryers). There are several commercial products available to dissipate static electricity, including anti-static mats and sprays available at most computer stores.

Stay Calm

Become a calm, effective troubleshooter, checking first for the obvious: power supply, loose connections, adjustable device features (e.g., display and volume). Know when to call for help and trust that the technicians do want to help. Be brave and resourceful ... be a "teacher."

VOCA TROUBLESHOOTING CHECKLIST

- Is the VOCA turned on?
- If there is a display control knob, does it need to be adjusted?
- If there is a volume control knob, or internal (software) setting, does this need to be changed or adjusted?
- Check to make sure that the overlay you are trying to use corresponds to the level or page of the program that you're in.
- Check to make sure that you are in the right "mode" (for example, spelling mode vs. language production mode).
- Does the VOCA use batteries? Have they been charged, or do they need to be charged?
- If the VOCA has been charged and still does not work, is there a short in the charger? Try using another charger. (*Please* make sure that you are using the charger that was designed for or came with your VOCA.)
- Does the device use rechargeable batteries? Have they been replaced recently? Even rechargeable batteries eventually must be replaced.
- If you are on an unpainted metal surface, *please* be sure that you ground yourself by using a rubber mat, before using your VOCA.
- Check the troubleshooting guide provided by your VOCA manufacturer.

When to Call for Help

If you need to call the vendor for assistance, it helps to have the telephone near the VOCA. Have the following information available:

- The VOCA type.
- Name, version, and serial number of the device.
- What happened or what didn't happen.
- The steps you have already taken or tried to solve the problem.

Keep serial numbers and names of equipment in a loose-leaf notebook with blank pages for recording problems and solutions.

PLEASE KEEP A COPY OF THIS CHECKLIST IN A CONVENIENT LOCATION!

APPENDIX A
GLOSSARY

It's exciting to embrace a new technology that holds so much promise, but there are moments of anxiety in tackling any new endeavor. Part of this anxiety occurs as you encounter new vocabulary. New fields breed new terms to express ideas or processes, and education is famous for its jargon. Just remember that the terms are simply labels for concepts that you learn — in fact, may already know. To take the edge off, here are a few definitions of some prevalent terms in the field of AAC.

Activation: VOCAs can be accessed in a variety of ways. The most straightforward is called *direct selection*, in which the student presses a selected key or cell and the machine "talks." Another type of direct selection involves *pointing* to the cell by means of a light, which activates the chosen cell. Devices can also be accessed by other remote means: (a) a single switch for scanning (pressure, motion, lever, etc.); (b) a panel or array of switches; and (c) a joystick, track ball, or mouse. Consistent, reliable activation is perhaps one of the most important elements in effective VOCA use. Therefore, it is paramount that both trainer and student work toward that end.

Adjustments and modifications: Most devices have adjustable features that are easy to manipulate and will give you some sense of power over this machine. Displays, as suggested before, can be modified, as well as volume. As the need arises, you and your team might want to provide some external modifications to make the device more functionally and cosmetically acceptable. Modifications that can be made include: homemade carrying cases, attached handles or easels, and attached pointers for greater pressure on the cells.

Dedicated device: Voice output communication is produced by some type of computer processor. When that processor's primary or exclusive function is to process and produce communication, it is considered dedicated. Because of the memory requirements to produce speech and to store codes for speech, currently most devices are dedicated. Therefore, you need to recognize that expecting other functions (such as calculating, timekeeping, recordkeeping, or word processing) from them is probably unrealistic. In some cases, the computer base of the device is well equipped to handle these tasks, but shifting from one program to another is risky.

Digitized speech: Speech that is produced from prerecorded speech samples, either as intact words or as segments of words. Flexibility to produce novel utterances depends on how many sounds have been recorded; therefore, the more sophisticated systems use a great deal of computer memory. Although digitized speech would seem to be more intelligible and of higher quality, other factors play into the overall effect, including the speaker system of the device.

Displays: This generally refers to an LCD (light cathode display) or LED (light emitting diode), which may well enhance the intelligibility of a device by giving feedback to the sender for self-correction and providing clarification to the message receiver. Most displays feature a control that can adjust the lines for viewing at various angles.

Fixed vocabulary: This term is somewhat misleading because it applies to two kinds of VOCAs. Fixed vocabularies are the words that are programmed into the device by the manufacturer. In some cases, these cannot be altered; in other cases, you may submit revisions for the manufacturer to reprogram.

Overlays: This refers to a word or picture page that is placed over the device to indicate which key or cell will produce the intended messages. Generally these overlays are gridded and may have either words or pictures representing concepts. These cues enable the student to locate and identify keys (cells) for specific message production. (These are analogous to letters on typewriter keys.) The overlay or overlays may also be removable or duplicated and serve as a ready-made communication aid when the actual device proves too cumbersome for some situations or is in need of repair.

Power supply: Currently devices have rechargeable batteries, but caution should be taken to make sure that they are charged the recommended amount of time with the correct cord. Frequent charging, when batteries have not been sufficiently discharged, may diminish the capacity of the battery to accept a full charge.

Programmable vocabulary: All vocabulary is "programmed"; however, this term refers to devices that can be programmed on site by trainer or student, as opposed to being returned to the manufacturer.

Synthesized speech: Speech that is produced by synthesizing (blending) a limited number of sound segments. Because it is simply a combination of established sounds, it tends to sound robotic.

VOCA: Voice output communication aid, generally a device that uses computer-generated speech for communication.

Volume control: This may refer to either a volume control dial affixed to the device, or volume control options within the VOCA software or program. In addition to volume controls, some VOCAs may include an ear jack for privacy or auditory feedback for people with visual impairments (for message selection).

APPENDIX B
DEVICES AND VENDORS

Adaptive Communication Systems, Inc.
354 Hookstown Grade Road
Clinton, PA 15206
800/247-3433; 412/264-2288
SpeechPAC, Alltalk, RealVoice, Dyna Vox, ScanPAC, EvalPac with RealVoice

Artic Technologies
55 Part Street, Suite 2
Troy, MI 48083-2753
313/588-7370
Artic D'Light, Artic Crystal

Audio Bionics
9817 Valley View Road
Eden Praire, MN 55344
800/328-4827, ext. 1400
Lifestyle Personal Communicator

Canon U.S.A., Inc.
One Canon Plaza
Lake Success, NY 11042
516/488-6700
Canon Communicator M

Crabapple Systems
803 Forrest Avenue
Portland, ME 04101
207/797-2388
SpeechBox, SpeechPad

Crestwood Company
6624 North Sidney Place
Milwaukee, WI 53209
414/352-5678; FAX: 414/352-5679
Portable Pocket Computer

EKEG Electronics Company, Ltd.
P.O. Box 46199, Station G
Vancouver, BC V6R 4G5 Canada
604/273-4358
Keyboards for Speak N' Spell

Eyegaze Computer System
LC Technologies, Inc.
4415 Glenn Rose Street
Fairfax, VA 22032
703/425-7509
Eye Controlled Communicator

F. Keep Company
22501 Mt. Eden Road
Saratoga, CA 95070
408/248-2579; 408/741-5368
CATT 425 and 525

Innocomp, Innovative Computer Applications
33195 Wagon Wheel
Solon, OH 44139
216/248-6206
Say-it-All II and II plus

Phonic Ear Inc.
250 Camino Alto
Mill Valley, CA 94941
800/227-0735; 415/383-4000
VOIS 136, VOIS 160

Prentke Romich Company
1022 Heyl Road
Wooster, OH 44691
800/642-8255; 216/262-1984 (Ohio)
IntroTalker, Smoothtalker for Light Talker and Touch Talker, Light Talker, Touch Talker

Sentient Systems Technology, Inc.
5001 Braum Boulevard
Pittsburgh, PA 15213
412/682-15213
EyeTyper 300

Shea Products, Inc.
1721 West Hamilton Road
Rochester Hills, MI 48309
313/852-4940
Special Friend Speech Prosthesis

Sonoma Developmental Center
Communication Engineering
15000 Arnold Drive
P.O. Box 1493
Eldridge, CA 95431
707/544-1573
Sonoma Voice

Dr. Douglas Sorenson
5937 Portland Avenue South
Minneapolis, MN 55417
612/866-1661
Rescue Speech System

TASH, Inc.
70 Gibson Drive Unit 12
Markham, ON, Canada, L3R 4C2
416/472-2212
Talk-O

Venture Technologies
110-340 Brooksbank Avenue
North Vancouver, B.C., Canada, V7J 2C1
604/986-9803; 800/663-8931 (In U.S.)
TurboSelect™

Wayne County Intermediate School District
Attention: Greg Turner
33500 Van Born Road
Wayne, MI 48184
313/467-1415
WOLF, ScanWolf

Words+, Inc.
P.O. Box 1229
44421 10th Street, West
Suite L
Lancaster, CA 93535
805/949-8331
AudScan II, Equalizer, Talking Board

Zygo Industries, Inc.
P.O. Box 1008
Portland, OR 97207
503/684-6006
Macaw, Lightwriter, Scribe, Zygo Talking Notebook II, Switchboard

Other

Inch Associates
9568 Hamilton Avenue
Suite 104
Huntington Beach, CA 92646
INCH Assessment (International Checklist for Augmentative Communication)

Don Johnston Developmental Equipment, Inc.
P.O. Box 639
1000 North Rand Road, Building 115
Wauconda, IL 60084
312/526-2682
Oakland Schools Picture Dictionary

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APPENDIX C
RESOURCES

Journals and Newsletters

AAC: Augmentative and Alternative Communication Journal, Williams & Wilkins, P.O. Box 2391, Baltimore, MD 21203; 800/638-6423.

Augmentative Communication News, One Surf Way, Suite 215, Monterey, CA 93940.

Closing the Gap, P.O. Box 68, Henderson, MN 56044; 612/248-3204.

Communicating Together, Easter Seal Communication Institute, 250 Ferrand Drive, Suite 200, Don Mills, Ontario, Canada M3C 3P2.

Communication Outlook, % Artificial Language Laboratory, Computer Science Department MSU, East Lansing, MI 48824

Computer Disability News, National Easter Seal Society, 2023 W. Ogden Avenue, Chicago, IL 60612; 312/243-8400.

The Exceptional Parent, 1170 Commonwealth Avenue, Third Floor, Boston, MA 02134.

Organizations

Applied Science and Engineering Laboratories, University of Delaware A.I. duPont Institute, 1600 Rockland Road, Wilmington, DE 19899; 302/651-6830.

ASHA (American Speech-Language-Hearing Association), 10801 Rockville Pike, Rockville, MD 20852-3279; 301/897-5700.

Council for Exceptional Children, 1920 Association Drive, Reston, VA 22091; 703/620-3660.

RESNA, 1101 Connecticut Avenue NW, Suite 700, Washington, DC 20036; 202/857-1199.

TASH (The Association for Persons with Severe Handicaps), 7010 Roosevelt Way N.E., Seattle, WA 98115; 206/523-8446.

Trace Research and Development Center, 314 Waisman Center, 1500 Highland Avenue, Madison, WI 53706-2280.

USSAAC (United States Society for Augmentative and Alternative Communications), % ISAAC, P.O. Box 1762, Station R, Toronto, Ontario, Canada M4G 4A3.

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ASHA (American Speech-Language-Hearing Association). (1986). *Augmentative communication: An introduction.* Rockville, MD: Author.

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Carlson, F. (1982). *Alternative methods of communication.* Danville, IL: Interstate Printers and Publishers.

Goosens, C. & Crain, S. *Augmentative communication intervention resource.* Wauconda, IL: Don Johnson Developmental Equipment.

McNaughton, S. (Ed.). (1985). *Communicating with blissymbolics.* Toronto: Blissymbolics Communication Institute.

Musselwhite, C. B. (1966). *Adaptive play for special needs children: Strategies to enhance communication and learning.* San Diego: College-Hill Press.

Musselwhite, C. R. (1982). *Communication programming for the severely handicapped: Vocal and non-vocal strategies.* San Diego: College-Hill Press.

Silverman, F. (1980). *Communication for the speechless.* Englewood Cliffs, NJ: Prentice-Hall.

APPENDIX D

(This appendix is a partial printing of a Tech Use Guide developed for the Center for Special Education Technology by Beth Mineo.)

Tech Use Guide — Using Computer Technology

Augmentative and Alternative Communication

Augmentative and alternative communication (AAC) refers to any approach designed to support, enhance, or augment the communication of individuals who are not independent communicators in all situations (Beukelman, Yoder, & Dowden, 1985). Communication augmentation is appropriate for those who experience difficulty with the spoken and/or written forms of expressive communication. It is important to note that an individual's communication system should not be a single device or technique, but rather a collection of techniques, devices, and strategies that can be employed as the communicative situation warrants. Components of this collection include gestures, facial expression, writing, residual speech, signal systems, nonelectronic communication systems of various sizes and complexity, and electronic AAC technology.

Benefiting from AAC Approaches

AAC approaches benefit individuals with severe difficulties in speaking and/or writing. For those whose oral-motor dysfunction is so severe that speech is not intelligible, AAC approaches provide an alternate method of expression. Individuals with limited arm and hand movements can take advantage of alternate access to print capabilities. AAC approaches with spoken output can assist individuals with low vision, and AAC systems with visual display and print capabilities can assist individuals with hearing impairments. AAC approaches may also be beneficial for individuals with cognitive impairments, not only as a means of expressive communication but also as a language learning tool.

"Low Tech" Approaches

There are many AAC approaches that do not involve sophisticated technology. These approaches may be implemented in isolation, but they more often serve as components in a comprehensive AAC intervention.

Signal Systems. These systems permit an individual to call for help, attract attention, and answer simple yes/no questions. Such systems usually consist of a switch and a signal of some type. The switch is placed in proximity to a body part that the user can move easily and reliably. The signal could be a buzzer or chime, or it could be a tape-loop saying "Come here" or "I need help." Some individuals may be able to use the signal for simple coded messages (for example, one buzz means yes, two buzzes means no, three buzzes means I don't know) or for Morse code.

Communication Boards. This term refers to any display containing vocabulary choices from which the user selects a message. Low tech communication boards are those without electronic components. They can be made using a variety of materials, including wood, plexiglass, posterboard, notebooks, and paper. Communication board displays may contain objects, letters and numbers, words, phrases, photographs, or graphic representations. Brandenburg and Vanderheiden (1988) summarized the many factors that must be considered in the design of a communication board. These include:

- The physical technique the individual will use to select message components from the display.
- The types of symbols to be used on the display.
- The vocabulary items to be included.
- The arrangement of vocabulary on the display.
- The interaction strategies that the augmented communicator will use.
- The attitudes and communication styles of the augmented communicator and potential communication partners.

An individual might have a single board that contains letters and numbers and enough words and frequently occurring phrases to meet most of his communication needs. A student might use different mini-boards for different academic subjects or for different settings (playground, mall, Sunday school). Communication boards also serve as a back-up system should the user's electronic system fail.

"High Tech" Approaches

The incorporation of microprocessor technology into AAC systems has made a number of valuable features possible.

Large Vocabulary. Many AAC systems offer vocabulary capacities in excess of 2,000 entries. The challenge for the user is the management of such large vocabularies, because most systems have static displays containing a finite (and relatively small) number of items. Systems such as *Say-it-All II Plus*, *scanWRITER*, and *VOIS 160* store vocabulary at a number of levels, requiring the user to activate the appropriate level as well as the correct location on the display in order to make a message selection. Users often consult a glossary that lists available vocabulary along with the activations that are required to access each item.

Several approaches have been designed to minimize the memory demands on the user. All of the devices mentioned thus far can accommodate multiple overlays, one corresponding to each memory level. A new device, *The Talking Screen*, offers a dynamic display — the display itself changes, permitting each level to be displayed without any manual changing of overlays. *The Touchtalker with Minspeak* uses multimeaning icons to facilitate access to vocabulary items not visible on the display. The user codes his vocabulary selections with meaningful sequences of pictures, and thus doesn't need to remember a large number of letter or number codes.

Output Displays. Many devices contain LED or LCD areas for display of messages. As the user makes a selection, the words appear in the display. This permits the user to review the message, and serves as a medium for the communication exchange between partners. Many systems also generate hard copy (print on paper), a useful feature when a permanent record of communication is desired.

Speech Output. One of the most significant advances in AAC has been the availability of spoken output. Speech output renders technology accessible to those who cannot read and those with visual impairments. It also makes communication possible in the traditional auditory modality. Some devices, like the *Mini Talking Card Reader*, record short segments of a speaker's voice onto magnetic tape. Devices like the *Wolf* and *Touchtalker* produce synthesized speech, which is created by subjecting text to a set of pronunciation rules.

The appeal of synthesized speech is its flexibility. Any utterance that can be entered as a text string can be produced, resulting in the potential for unlimited vocabulary. The sophistication of speech synthesizers varies, as does the quality of the speech they produce. Generally, research has demonstrated that *Echo, Votrax,* and *Smoothtalker* speech are significantly less intelligible than *DECtalk* speech (Mirenda & Beukelman, 1987).

An alternative to synthesized speech is digitized speech. In this approach, the speech is digitally recorded, modified for storage in the system, and then reconstructed as spoken output. Although this process yields much more natural-sounding speech, it is very memory-intensive. It is also less flexible than synthesized speech because only prerecorded output can be used. Among the AAC systems offering digitized speech capabilities are the *Introtalker, ALLTALK*, and *Parrot.*

Input Modes. Advances in input technology facilitate access to AAC systems for individuals with the most severe motoric limitations: almost any physical movement now can be harnessed to control communication systems. For example, the *P-Switch* can be activated by almost any muscle movement and can be used to control scanning communications systems. *Voicescribe-1000,* a voice input system with a potential 1,000-word vocabulary, can be used by individuals with consistent vocal output who need to access written communication options. *Freewheel* is a cordless device that allows head-pointing and other body motions to be used to access standard software on a personal computer.

Rate Enhancement Techniques. Several AAC systems incorporate features that improve the efficiency of communication for the user. Prediction routines, such as those found in the *Portable Anticipatory Communication Aid* (PACA) and *Equalizer,* learn the word usage frequencies of the user. When the user begins entering a word, the system responds with the most frequently used words beginning with that letter sequence. Abbreviation routines, as found in the *RealVoice*, allow the user to access items in memory using abbreviation. For instance, the system might be programmed to produce "See you later" with the single keystrokes "C-U."

Customizability. Each individual has unique communication needs, and it is important to be able to customize a system to meet those needs. Many systems come with a standard vocabulary, but allow the user or caregiver to program in additional vocabulary as needed. Similarly, most systems offer the consumer the option of customizing overlays to make them appropriate to the user's cognitive and linguistic abilities.

Assessment and Intervention

Every user presents a unique constellation of needs and abilities, and the range of available AAC systems expands yearly. The process of matching user needs to appropriate interventions should involve thorough evaluation and careful consideration of options.

Potential consumers of AAC interventions may demonstrate deficiencies in motor abilities, cognitive abilities, language skills, social/emotional development, and performance of activities of daily living. All of these areas should be evaluated, because AAC intervention will be affected by them and will in turn exert some influence on them. The need for such a comprehensive approach requires that input be derived from a multitude of sources. A team approach is essential, with expertise being shared among parents, potential AAC consumers, teachers, aides, speech/language pathologist, occupational therapists, physical therapists, medical personnel, ophthamologists, audiologists, educational diagnosticians, psychologists, social workers, rehabilitation engineers, and others with pertinent input. Several protocols have been developed to guide the assessment process (see Beukelman, Yorkston, & Dowden, 1985 and Blackstone, Cassatt-James, & Bruskin, 1988).

It should be emphasized that AAC assessment and intervention are not discrete events, but rather components of the process of assisting an individual to reach his or her highest potential. Contrary to popular belief, the process is not completed when a consumer acquires an AAC system. Understanding of AAC has matured in the past decade, and most people now realize that successful communication abilities do not emerge automatically as a function of device acquisition. Communication skills must be taught, with the goal being the achievement of **communicative competence**. Light (1989) defines a competent communicator as one whose communication is functional, adequate, and skilled in regard to the linguistic, operational, social, and strategic aspects of communication. A competent communicator is one whose communication can meet the demands of daily life. The communication does not have to be perfect, because no one is a perfect communicator. Rather, the user should demonstrate an adequate grasp of vocabulary and grammar, adequate operation of the AAC systems, appropriate interaction skills, and the ability to employ compensatory strategies to enhance communicative effectiveness.

Attention should be directed toward all of these abilities during training. Furthermore, training should be provided not only for the augmented communicator, but for the communication partners as well. Caregiver training could almost be considered a prerequisite for success. Without interested, encouraging, skillful partners, many of the augmented communicator's opportunities for learning and practice would be lost. Given the importance of early success to later motivation and effort, it is essential that training be directed at both sides of the communication dyad.

Crucial Intervention Issues

Training Interaction Strategies. So often people with severe expressive communication problems learn to assume a passive role in communication interactions. They get lots of practice responding, but little experience initiating. Thus, AAC intervention must include explicit instruction in interaction behaviors and strategies. AAC consumers must learn that there is no single correct way to interact with all communication partners: The interaction strategies employed should be selected on the basis of the communication task, the setting, and the skills and attitudes of the partner. Consumers must learn how to get attention, introduce topics, negotiate meaning, interrupt, convey emotion, take turns, and resolve communication breakdowns. They need to learn to work with their communication partners to maximize the successful transfer of information. Kraat (1987) provides an excellent overview of this topic.

Promoting Language and Literacy Skills. The lack of language and literacy skills limits an individual's AAC options. Systems based on spelling, or those requiring knowledge of morphological and syntactic conventions, are inaccessible to individuals without sufficient language and literacy skills. Difficulties with these skills often hold students back from academic achievement and prevent adults from performing adequately at the job site. This topic has just recently begun to be addressed in the literature. Blau (1988) suggested a four-phase approach to developing literacy in young children that emphasizes a positive reading experience, development of a sight work vocabulary, an introduction to phonics, and the development of sentence comprehension. Very young children who have had access to a symbol-based communication system may have an inherent understanding of symbolic representation, lessening the difficulty of the transition to the written word.

Children who are nonspeaking do not have the opportunity to practice sound/letter correspondence orally, so interventionists must emphasize these relationships in other ways. Access to an AAC system may provide an individual with his first opportunities to experiment with sound combinations (if the system has voice output) and language manipulation. Cohen (1988) suggests ways in which word processing software developed for the regular education market can facilitate the development of literacy skills.

Vocabulary Selection. An AAC consumer's communicative effectiveness and efficiency can be enhanced if the system provides access to the appropriate vocabulary. There are many techniques that one can use in making vocabulary determinations. In all cases, it is crucial to approach this task in terms of what the consumer wants and needs. Yorkston and her colleagues (1989) described several methods to employ when selecting vocabulary:

Environmental inventories — This approach to vocabulary selection involves a survey of each of the environments in which the AAC consumer interacts to determine the people and objects present and the activities that are likely to occur. From these observations, lists of potential vocabulary items can be generated.

Communication diaries — AAC system vocabulary should be updated frequently to reflect changes in the user's lifestyle and communicative interactions. To facilitate this updating, the consumer can compile a history of communications either by printing and saving all output (if the system has this capability) or by having someone record the communications for a period of time. Analysis of this record will reveal those items used frequently that are not available in the vocabulary.

Vocabulary list review — Another excellent technique is the review of vocabulary lists. It is difficult to generate vocabulary items spontaneously, but much easier to recognize appropriate words on a list. A review of standard lists is also helpful in identifying the structural words essential for grammatically correct utterances. Often these words are overlooked because the focus is on listing words that will expand the content of a user's communication.

Blau (1986) offers some guidelines for evaluating the utility of selected vocabulary. Among her criteria are:

- Can the item be used to code a variety of communicative functions?
- What is the potential for recombination of the item?
- How frequently is the item used, and in what settings?
- How much information is conveyed by the item?
- How high in reinforcement value is the item for the consumer?
- Does the item have potential for peer interaction and play?
- How much interest does the item hold for the consumer?

In determination of vocabulary, as in all aspects of assessment and intervention, the consumer should be involved in the process to the greatest extent possible.

Availability Information

Trace Resourcebook: Assistive Technologies for Communication, Control, & Computer Access. Available from the Trace Center, address above.

Wallchart on Commercially-Available Communication Aids. Available from Applied Science and Engineering Laboratories, address above.

Assistive Technology Sourcebook. Available from RESNA, address above.

ABLEDATA (product database). Available from Adaptive Equipment Center, Newington Children's Hospital, 181 East Cedar Street, Newington, CT 06222, 800/344-5405.

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Products Mentioned in Text

ALLTALK, FreeWheel, RealVoice. Adaptive Communication Systems, Inc., 354 Hookstown Grade Road, Clinton, PA 15026, 412/264-2288.

Mini Talking Card Reader. Crestwood Company, P.O. Box 04606, Milwaukee, WI 53205, 414/461-9876.

Voicescribe-1000. Dragon Systems, Inc., 55 Chapel Street, Newton, MA 02158, 617/965-5200.

Say-It-All II Plus. Innocomp, 33195 Wagon Wheel, Solon, OH 4439, 216/248-6206.

VOIS 160. Phonic Ear Inc., 250 Camino Alto, Mill Valley, CA 94941, 415/383-4000.

Introtalker, Touchtalker, P-Switch. Prentke Romich Company, 1022 Heyl Road, Wooster, OH 44691, 216/262-1984.

Equalizer, Talking Screen. Words +, Inc., P.O. Box 1229, Lancaster, CA 93535, 805/949-8331.

Parrot, scanWRITER, PACA. Zygo Industries, Inc., P.O. Box 1008, Portland, OR 97207, 503/684-6006.

Readings

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Light, J. (1989). Toward a definition of communicative competence for individuals using augmentative and alternative communication systems. *Augmentative and Alternative Communication,* 5, 137-144.

Mirenda, P. & Beukelman, D. R. (1987). A comparison of speech synthesis intelligibility with listeners from three age groups. *Augmentative and Alternative Communication,* 3, 120-128.

Mirenda, P. & Mathy-Laikko, P. (1989). Augmentative and alternative communication applications for persons with severe congenital communication disorders: An introduction. *Augmentative and Alternative Communication,* 5, 3-13.

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SORTING THROUGH AUGMENTATIVE COMMUNICATION
MOFFITT & DETERDING, 1990

	ACCESS		FLEXIBILITY				SYMBOL USE					VOICE			COST		
Equipment	direct	non-direct	user program ability	vocabulary size	printed output built-in	opt.	visual output	pict	word	letter number	gender avail.	pitch varia.	volume control	intelligibility (subj. scale 1-5)	dig/ syn	Approximate Cost	MAN/ Ven#
Light Talker	x	x	x	Virtually Unlimited Mult. softw. pkgs. avail.		x	LED	x	x	x	(x with new voice)	x	x	4-5	S	$4290 - (new voice $300)	11
Talker II	x		x	250 store text/speech			x	x	x			x	Digital 7 levels	3-4	S	$2495	6
Sonoma Voice	x		Programmed by manufacturer	64-256 phrases				x	x	x			x	4	S	$414-440	14
Touch Talker	x		x	Virtually Unlimited Mult. softw. pkgs. avail.		x	LED	x	x	x	(x with new voice)	x	x	4-5	S	$3695 - (new voice $300)	11
All Talk	x		x	Level I- 600 words Level II- 1200 words				x	x	x	x	(x)	x	4-5	D	$2995 Lev. I $3995 Lev. II	1
Wolf	x		x	User 800 words, fixed 500 words				x	x	x				3-4	S	$275	20
Scanwolf		x	x	User 800 words, fixed 500 words				x	x	x				3-4	S	$375	20
Vocaid	x		Preprogrammed	5 overlays 36 squares				x	x	x				5	S	$148 - 300	3, 7, 16, 17
Speech Friend Speech Prosthesis	x	x	x	26 x 26 memory loc.			LCD	x	x	x		low med, hi	x	4	S	$2390 Direct $3250 Scanning	13
Lightwriter	x		Limited	12 stored phrases, 33 words, 20 keys, 250 char. ea.	x		2 LED user > listener			x		x	x	3-4	S	$5500	23
VOIS 160	x		x	Virtually Unlimited			x	x	x	x				4-5	S	$3595	9
Zygo Talking Notebook II	x		x	Virtually Unlimited		x	x			x		x	x	4	S	$1495 - 2495	23
PACA		x	x	750 word memory 55 x 20 charac. line	x				x				x	4	S	$2850	23
Tiger, Jr.	x		Preprogrammed	375 words need Magic				x	x				opt.	3-4	S	$150	18

	ACCESS		FLEXIBILITY				SYMBOL USE					VOICE			COST		
Equipment	direct	non-direct	user program ability	vocabulary size	printed output built-in	opt.	visual output	pict	word	letter number	gender avail.	pitch varia.	volume control	intelligibility (subj. scale 1-5)	dig/ syn	Approximate Cost	MAN/ Ven#
Talk-O	x purch.	x separately	x	120 sec. recording time				vary	by	access method	x	(x)	x	5	D	$2300	16
Speech Pad (converted Power Pad)	x		x	16-255 words or phrases				x	x	x				4-5	S	$899	24
Secretary	x		x	32 sec. 10 brief messages	x		x				x	(x)		5	D	$1995	23
Say-it-Simply Plus	x		x	762 words or phrases						x	x		x	4-5	S	$1350 (1989)	5
Say-it-All II Plus	x		x	846 words or phrases		x	x (opt)			x	x		x	4-5	S	$1595 (1989)	5
Real Voice (Speechpac)	x		x	27,000 characters Virtually Unlimited	x		x	x	x	x	x	x	x	4-5	S	$2895	1
CATT 425	x		x	32 sec.			x (opt)	x	x	x	(x)	(x)	x	5	D	$695	25
Macaw	x		x	1 min (hq) 2 min (ep)						x	x	(x)	x	5	D	$995	23
Scanning Macaw	x	x	x	1 min (hq) 2 min (ep)						x	x	(x)	x	5	D	$1495	23
Eyetyper 300	x eye-gaze		x	Virtually Unlimited		x	x			x			x	3-4	S	$3495	12
IntroTalker	x		x	1 min (norm) 2 min (ep)				x	x	x	x	(x)	x	5	D	$795	11
EvalPac with Real voice	x	x	x	27,000 characters Virtually Unlimited	x		x	x	x	x	x	x	x	4-5	S	$3995	1
Parrot	x		x	32 sec 16 messages						x	x	(x)	x	5	D	$595	23
CATT 525	x		x	120 pre-programmed + 10 brief messages open			x (opt)	x	x	x			x	3-4	S	$695	25
Scanning IntroTalker		x	x	1 min (norm) 2 min (ep)				x	x	x	x	(x)	x	5	D	$995	11

STEPS IN VOCABULARY SELECTION

1. Assess the receptive and expressive language skills of the student using the current AAC aid or technique.

2. Interview significant people in the student's life regarding the appropriateness and effectiveness of the vocabulary previously selected.

3. Review present vocabulary to determine the frequency of use of each symbol/word/phrase/sentence.

4. Evaluate sample lexicons. A lexicon may include alphabet for spelling single words, carrier phrases, or complete sentences.

The vocabulary and lexicon should permit a variety in discourse functions:

=> Plan for power or the opportunity for conversation control (e.g., "That's not what I meant.")

=> Social conversation with peers and interaction with strangers.

=> What words would allow the student to give answers — at home, at school, or among strangers?

=> Is there vocabulary that allows the student to ask questions?

=> List statements that allow:
a. control of the interaction (e.g., "Ask me a different question.")
b. guide the listener in the use of the system (e.g., "Adjusting my viewing angle knob. Read my display.")
c. add flavor to the conversation (e.g., "I don't agree.")
d. meet physical needs (e.g., "Help me into bed.")

=> Include interjections (e.g., "Good grief! Get a grip on it, Mom!")

=> Provide comments that cue the student's parents to include them in conversation (e.g., "Do you want my opinion? Here's my two cent's worth.")

=> Include high frequency carrier phrases like "I want to ..." with a wide variety of possible filler words (e.g., "eat lunch, go home").

=> For each different setting or environment, identify vocabulary specific to that situation.

=> Select words that represent a variety of different grammatical classes that can be combined in a variety of ways.

FOR A YOUNGER CHILD
Select vocabulary by evaluating activities the child enjoys and can be modified to be more interactive. Consider words for objects and actions that can be requested, people with whom they play, and descriptions of feelings or comments about an activity. Concentrate more on nouns, verbs, and modifiers as opposed to articles, verb tenses, etc.

5. Discuss with the team the functions of the vocabulary.
   a. To give answers
   b. To communicate socially with friends
   c. To participate in social group activities
   d. To communicate efficiently in public
   e. To communicate quickly in all situations
   f. To express novel ideas academically or socially
   g. To express basic needs

6. Identify five of the student's most preferred activities (e.g., eating at fast food restaurants, playing with siblings, scouting, bowling, etc.).

7. Introduce five methods for compiling a functional vocabulary. Select messages with multiple versatility and use — to be used in more than one situation.
   a. **Dialoguing** — choose a familiar routine, and document what the student and his communication partner say to each other during their interaction
   b. **Environmental inventory** — choose a preferred activity and list appropriate words and phrases that the student and his communication partner might say.
   c. **Shadow** — observe the student throughout an activity and record verbatim the sentences produced.
   d. **Role play** — partners act out a situation and record the vocabulary necessary to participate in the interaction.
   e. **Tape record** — through audio or video observation the partners list vocabulary specific to the activity as well as a more generic vocabulary.

Vocabulary selection is an ongoing process and must be re-evaluated and updated as needed.

Adapted from: *Training Caregivers and Facilitators to Select Vocabulary,* Gail Van Tatenhove, March, 1987.

TEN WISHES FROM A STUDENT WHO USES AUGMENTATIVE COMMUNICATION

To help you understand the feelings and thoughts of a student who uses augmentative aids and techniques, children from across the United States were asked, "If you could wish for one thing your teacher would do for you, what would it be?" Below are some of their answers.

1. I wish my teacher would joke with me.
2. I wish my teacher would learn how to work my communication aid.
3. I wish my teacher would stop shouting at me like I can't hear.
4. I wish my teacher wouldn't have a heart attack when my machine doesn't work.
5. I wish my teacher would remember that I don't always spell very well.
6. I wish my teacher would have more patience with me.
7. I wish my teacher would call on me for "Share Day."
8. I wish my teacher would give me enough time to say what I'm thinking.
9. I wish my teacher wouldn't hit my machine when it doesn't work — That's my mouth she's hitting!
10. I wish I could walk and talk like my sister and brother.

LEVEL: ADMINISTRATOR

GOAL: #5 Gain an overview of augmentative/alternative communication (AAC) system as a means of meeting the needs of young children with severe communication difficulties.

COMPETENCY TYPE: SKILL

OBJECTIVE: Participants will identify specific advantages for young children who utilize AAC systems.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
1. Large group activity Demonstrate one or two simple AAC systems which may be appropriate for use with young children (e.g., Manual Board, Introtalker, Wolf). Manual Board: Describe how it could be used in classroom or for play activity. Electronic Device: Demonstrate storage of a simple message under a symbol/icon and show how it can be retrieved.	1. Gain access to one or two AAC systems from your local SERRC or ORCLISH.	1. If the leader is familiar with scanning and switch use, a device such as Scan Wolf or Scanning Introtalker can be discussed or demonstrated.
2. Large group discussion Discuss the use of pictures on a manual board or symbols on an overlay. Present symbols on large paper and ask/discuss what messages they may represent.	2. Draw symbols on sheets of paper or use picture cards. Enlarged symbols from *Picture Communication Symbols* (Mayer Johnson) would also be appropriate.	2. Be sure to discuss the efficiency of using icons or symbols to effectively recall entire messages vs. the need for multiple symbols for multiple words (e.g., a picture of APPLE could convey "I'd like to have a snack.") On some devices (e.g., Touchtalker), a sequence of symbols EYE - APPLE - LIGHTNING BOLT could be chosen to represent the message "I want some fast food." By the same principle of efficiency, this message (five spoken words and/or 21 characters) could be communicated with just one keystroke.
3. Large or small group activity Assist participants in identifying specific advantages to use of AAC systems by young children (e.g., individually determined vocabulary, ability to interact/participate with peers, child has his/her own "voice," increase in autonomy/self-esteem, portability of system, flexibility of vocabulary — can modify as needs progress, etc.).		

LEVEL: ADMINISTRATOR

GOAL: **#5** Gain an overview of augmentative/alternative communication (AAC) system as a means of meeting the needs of young children with severe communication difficulties.

COMPETENCY TYPE: VALUE/ATTITUDE

OBJECTIVE: Participants will explore strategies for use of AAC systems in effectively integrating children with severe communication difficulties within typical curricular activities.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
1. Large or small group activity Ask participants to name specific issues relevant to integrating the child using an AAC system within the preschool curriculum. Record issues on left side of the chart when discussed in large group.	1. Flip Chart, markers. See "Augmentative Communication Devices" ("Technology User in the Classroom") in A-L12.	1. Be sure to include the following general issues within the discussion: – Selection of appropriate vocabulary for (play) activities – Selection of partners, settings, and routines most conducive to interaction and integration with peers – Need for ongoing reevaluation of goals and objectives – Need for transdisciplinary approach in selecting objectives and designing routines – Availability of appropriate equipment – Reinforcement within home setting
2. Ask participants to share ideas for effective strategies for the issues listed. Record strategies correspondingly in the right column. Encourage participants to share personal experiences in dealing with the issues raised.	**Supplemental Resources** *Augmentative communication: Intervention resource* (Goossens & Crain, 1985), *Augmentative communication: Implementation strategies* (Blackstone, Cassatt-James, & Bruskin, 1988), and *Adaptive play for special needs children — strategies to enhance communication and learning* (Musselwhite, 1986), as listed in the references.	2. In discussing strategies, the leader should encourage a transdisciplinary problem-solving model which results in language goals within all aspects of curricular activity. Information from all team members is used to design routines in which access to appropriate vocabulary will provide for maximal opportunities for participation.

Technology

GOAL 6

LEVEL: ADMINISTRATOR

GOAL: **#6** Gain practical information regarding obtaining funding for assistive technology devices and services.

COMPETENCY TYPE: KNOWLEDGE

OBJECTIVE: Participants will become familiar with a four-step process to seeking and obtaining funding, several primary sources of funding, and key strategies.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
1. Large group activity Discuss a process for obtaining funding. State that although funding can be very complex and time-consuming, it can be made much easier through the gaining of appropriate information regarding the process, and of course, a dedicated and patient advocate! Using Transparency A-T6, *Four Steps to Funding,* briefly overview the four-step process. Highlight the following: **Step 1: Assessment —** Be sure to highlight the importance of a thorough evaluation, consideration of future needs, determination of various possible devices or approaches, and trial periods with devices determined to be appropriate.	1. For purposes of this presentation, *Steps to Funding; General Information and Resources for Obtaining Augmentative and Alternative Communication Aids and Services in Ohio*can be obtained. For additional copies for your participants, contact: Diane Dynes, Speech Pathology Department, St. Elizabeth Rehabilitation Center, 601 Edwin Moses Blvd., Dayton, OH 45408. Price is $1.00 per booklet with reduced prices based on number ordered. Your local SERRC Center may also have these available — contact the ORCLISH contact person at your local SERRC. Transparency (A-T6) *Four Steps to Funding* Leader Notes (A-L13) *Funding in Ohio*	1. Transparency A-T6 highlights the booklet described under resources. Additional information regarding several of the Ohio agencies discussed in this section can be found in Leader Notes A-L13. This information is provided for the presenter's benefit, and does not represent a full sampling of possible funding sources nor an entirely complete set of information on these particular agencies.

LEVEL: ADMINISTRATOR *(continued)*

GOAL: **#6** Gain practical information regarding obtaining funding for assistive technology devices and services.

COMPETENCY TYPE: KNOWLEDGE *(continued)*

OBJECTIVE: Participants will become familiar with a four-step process to seeking and obtaining funding, several primary sources of funding, and key strategies.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
Step 2: Determining a Funding Advocate and Developing Funding Strategies — Cite the fact that research has shown that the most critical component of the funding process is the determination of a funding advocate. Highlight the variety of individual factors which must be considered in developing a funding strategy. Emphasize that cost should never preclude the selection of the most appropriate system. Emphasize that the advocate must explore all possible options, and based on an understanding of these resources, develop a plan of prioritization.		
Step 3: Applying to Funding Sources — Review the strategies on Transparency A-T7, *Useful Strategies When Applying for Funding*	Transparency (A-T7) *Useful Strategies When Applying for Funding*	
Review Transparency A-T8, *Supportive Documents for Funding Requests.* If time permits, share sample letter of necessity.	Transparency (A-T8) *Supportive Documents for Funding Requests*	
Using Transparency A-T9, *Medical Programs,* review these sources and emphasize that medical programs are always the first source to explore. Highlight the two key ingredients regarding the idea	Optional Handout (A-H24) *Sample Letter* Transparency (A-T9) *Medical Programs*	

LEVEL: ADMINISTRATOR *(continued)*

GOAL: **#6** Gain practical information regarding obtaining funding for assistive technology devices and services.

COMPETENCY TYPE: KNOWLEDGE *(continued)*

OBJECTIVE: Participants will become familiar with a four-step process to seeking and obtaining funding, several primary sources of funding, and key strategies.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
of speech prosthesis and the need to communicate medical needs. Emphasize that while medical claims may be denied, the appeals process is available for further pursual.		
Next, using Transparency A-T10, State and Government Agencies, review pertinent ones. Emphasize that these agencies may also be important channels to pursue if the individual meets given criteria, based on family income level, specific diagnosis, type of services needed, etc. Point out that many of the agencies listed in the booklet may not be appropriate for young children. Point out that BVR will be an important resource in later years when vocational goals may be used to support requests for funding.	Transparency (A-T10) *State and Government Agencies*	
In reviewing the *public schools' responsibility*, emphasize that the school may be responsible for providing assistive technology if the IEP team determines it to be necessary in order for a particular child to receive a "free appropriate public education."		Further elaboration of the public schools' responsibility for provision of assistive technology devices and services can be found in the Administrative section of Goal 6.

LEVEL: ADMINISTRATOR *(continued)*

GOAL: **#6** Gain practical information regarding obtaining funding for assistive technology devices and services.

COMPETENCY TYPE: KNOWLEDGE *(continued)*

OBJECTIVE: Participants will become familiar with a four-step process to seeking and obtaining funding, several primary sources of funding, and key strategies.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
Point out the major disadvantage: the child usually does not have access to the device outside of classroom time, and looses access to it should he/she move out of that particular district.		
Point out that *Trust Funds, Foundations, and Corporations* (Transparency A-T11) is the next source for pursual. While some research is necessary, many advocates have been pleasantly surprised to find large sums of money available for the asking.	Transparency (A-T11) *Trust Funds, Foundations, and Corporations*	
With Transparency A-T12, point out that *Nonprofit and Service Groups* should be the next on the list for pursual. Emphasize that these organizations are often excellent sources of information regarding other sources of available funding. Point out how these groups may be challenged to match contributions from other sources.	Transparency (A-T12) *Nonprofit and Service Groups*	
With Transparency A-T13, review *Fundraisers, Wish-Makers, and Public Appeal,* emphasizing that public appeal should be considered only after all other sources have been exhausted.	Transparency (A-T13) *Fundraisers, Wish-Makers, and Public Appeal*	

LEVEL: ADMINISTRATOR *(continued)*

GOAL: **#6** Gain practical information regarding obtaining funding for assistive technology devices and services.

COMPETENCY TYPE: KNOWLEDGE (continued)

OBJECTIVE: Participants will become familiar with a four-step process to seeking and obtaining funding, several primary sources of funding, and key strategies.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
Step 4: Follow-Up — Returning to Transparency A-T6, present follow-up as a critically important step in the (ongoing) process. This may involve evaluating how well the proposed solution is helping to solve the original problem, ensuring that training for the student and adults is taking place, making necessary modifications to equipment and/or its use, and ensuring that its use is being integrated within all areas of the students functioning.	Transparency (A-T6) *Four Steps to Funding*	
2. Summarize by presenting Transparency A-T14, *Funding Steps.* Give participants Handouts G-H25, 26, and 27 for their future reference.	2. Transparency (A-T14) *Funding Steps* Handout (A-H25, 26, and 27) *Funding* *Funding Devices and Services in Augmentative and Alternative Communication* *Funding Agencies and Resources*	

FOUR STEPS TO FUNDING

Step One:
ASSESSMENT

Step Two:
FUNDING ADVOCATE
and
DEVELOPING STRATEGIES

Step three:
APPLYING TO SOURCES

Step four:
FOLLOW-UP

FUNDING IN OHIO

Bureau for Children with Medical Handicaps
246 N. High St.
P.O. Box 1603
Columbus, OH 43266

For information contact:
General Information
614/466-1700

Description:
Bureau for children with Medical Handicaps provides diagnostic and treatment services to children from birth to 21 years of age with physical handicaps or certain chronic illnesses.

Eligibility Criteria:
Diagnostic services are available to children up to their 21st birthday with no financial eligibility. Treatment services are provided based on medical diagnosis, and family income.

Principal Disabilities Served

- ☐ ALS
- ■ Amputation
- ■ Blind
- ■ Cerebral Palsy
- ■ Deaf
- ☐ Mental Retardation
- ☐ Multiple Sclerosis
- ☐ Muscular Dystrophy
- ☐ Musculo-Skeletal Injury
- ☐ Other Neuromuscular Diseases
- ■ Spina Bifida
- ■ Spinal Cord Injury
- ■ Traumatic Head Injury
- ■ Other
- ☐ All of the Above

Principal Technology Services Funded

- ☐ Information
- ☐ Referral
- ■ Assessment
- ☐ Recommendations
- ☐ Ordering
- ☐ Fitting
- ■ Fabrication
- ■ Evaluation
- ☐ Training
- ■ Maintenance/Repair
- ■ Follow-Up
- ■ Equipment (see below)
- ☐ Other

Primary Areas of Equipment Funded

- ☐ Aids for Daily Living
- ■ Augmentative Communication
- ☐ Computer Applications
- ☐ Environmental Control Systems
- ☐ Home/Worksite Modifications
- ■ Prosthetics and Orthotics
- ☐ Seating and Positioning
- ■ Aids for Vision/Hearing Impaired
- ■ Wheelchairs/Mobility Aids
- ☐ Vehicle Modifications
- ☐ Other

Services and/or Equipment Typically Not Funded:
Environmental modifications: education related items; vehicle modifications, historically does not fund electric wheelchairs.

Helpful Hints:
BCMH is part of the Maternal and Child Health Department of the Health Department of Ohio. The usual way families become involved with BCMH is through the hospital providing services. Families may also contact their local health department or BCMH directly. All diagnostic and treatment services must be through an approved provider.

Ohio Department of Education
Division of Special Education
933 High Street
Worthington, OH 43085-4087

For information contact:
Local School District
Special Education Coordinator

Description:
State law requires local educational agencies to provide appropriate educational programs for all identified handicapped pupils from age five (5) to twenty-one (21). Public Law 99-457, Section 619 has required that a plan be developed for serving three- to five-year-old identified handicapped children in the 91-92 school year.

Eligibility Criteria:
Any handicapped child who has been placed in special education programs in accordance with relevant federal and state regulations is eligible to benefit from funding. Each student must have an IEP (Individual Education Program). There are other specifics and financial guidelines to meet in the approved requirements. State categories are: Hearing Handicapped, Visually Handicapped, Orthopedically Handicapped, Other Health Handicapped, Severe Behavior Handicapped, Developmentally Handicapped, and Specific Learning Disabled.

Principal Disabilities Served

☐ ALS
☐ Amputation
☐ Blind
☐ Cerebral Palsy
☐ Deaf
☐ Mental Retardation
☐ Multiple Sclerosis
☐ Muscular Dystrophy
☐ Musculo-Skeletal Injury
☐ Other Neuromuscular Diseases
☐ Spina Bifida
☐ Spinal Cord Injury
☐ Traumatic Head Injury
☐ Other
☒ All of the Above

Principal Technology Services Funded

☐ Information
☐ Referral
☒ Assessment
☐ Recommendations
☐ Ordering
☒ Fitting
☐ Fabrication
☒ Evaluation
☒ Training
☐ Maintenance/Repair
☐ Follow-Up
☒ Equipment (see below)
☐ Other

Primary Areas of Equipment Funded

☐ Aids for Daily Living
☒ Augmentative Communication
☒ Computer Applications
☐ Environmental Control Systems
☐ Home/Worksite Modifications
☐ Prosthetics and Orthotics
☒ Seating and Positioning
☒ Aids for Vision/Hearing Impaired
☒ Mobility Aids
☐ Vehicle Modifications
☐ Other

Services and/or Equipment Typically Not Funded:
This Office is responsible only for providing funding to school systems through state and federal sources. Request for funding must be educationally relevant and necessary for a student to implement his or her IEP.

Helpful Hints:
A child must be classified as a Special Education Student before he or she is eligible to benefit from education of the handicapped funding. An IEP must be written that recommends technology services and/or equipment that is educationally relevant. All equipment becomes school district property. Contact the District Coordinator of Special Education in your local school district for more specific information.

(See Integrating Technology into a Student's IEP in the Appendix.)

Ohio Department of Mental Retardation/Developmental Disabilities
Family Resources Services Program
1821 Summit Road, #G30
Cincinnati, OH 45237

For information contact:
FRSP Coordinator
513/821-2128

Description:
Family Resources Services Program is a program aimed at assisting families who care for a family member who has mental retardation or a substantial developmental disability in their home. The program promotes the unity of the family by reimbursing them for all or part of the expenditures incurred in meeting the special needs of a person with mental retardation or other substantial developmental disability, expenditures that would promote self-sufficiency and normalization or prevent or reduce inappropriate institutionalization. Services provided on a sliding fee scale basis.

Eligibility Criteria:
A family is eligible for the Family Resources Program if a family member has mental retardation or other developmental disability, the family member with mental retardation or other developmental disability resides in the home and is in need of habilitation services, the family resides in the county in which reimbursement is sought and the individuals in the home comprise a family as defined by the program. There is a Family Resources Services Program in each county.

Principal Disabilities Served

☐ ALS
☐ Amputation
☐ Blind
☐ Cerebral Palsy
☐ Deaf
■ Mental Retardation
☐ Multiple Sclerosis
☐ Muscular Dystrophy
☐ Musculo-Skeletal Injury
☐ Other Neuromuscular Diseases
☐ Spina Bifida
☐ Spinal Cord Injury
☐ Traumatic Head Injury
■ Other (DD)
☐ All of the Above

Principal Technology Services Funded

☐ Information
☐ Referral
☐ Assessment
☐ Recommendations
☐ Ordering
☐ Fitting
☐ Fabrication
☐ Evaluation
■ Training
☐ Maintenance/Repair
☐ Follow-Up
■ Equipment (see below)
■ Other

Primary Areas of Equipment Funded

■ Aids for Daily Living
■ Augmentative Communication
☐ Computer Applications
■ Environmental Control Systems
■ Home/Worksite Modifications
■ Prosthetics and Orthotics
■ Seating and Positioning
■ Aids for Vision/Hearing Impaired
■ Wheelchairs/Mobility Aids
■ Vehicle Modifications
☐ Other

Services and/or Equipment Typically Not Funded:
Microcomputers which are not part of a communication device, or direct services to the handicapped family member.

Helpful Hints:
Families initial contact should be to the local County Board. Services are provided through approved providers.

Ohio Medicaid
Department of Human Services
317 E. 7th Street
Cincinnati, OH 45202

For information contact:
Rosemary Walton
614/466-8545

Description:
The Medicaid program is designed to provide quality health care to persons of low income defined as categorically and medically needy. The Medicaid program is sometimes called Title XIX because it is authorized by Title XIX of the Social Security Act. The Department of Human Services is designated as the single state agency to administer the program. The county offices of the Welfare Department determine eligibility for Medicaid.

Eligibility Criteria:
A disabled person who receives SSI or Social Security payments, Aid to Dependent Children, is eligible for the Healthy Start Program. Anyone who is legally blind or over 65 and meets financial eligibility is eligible for Medicaid. In addition, anyone eligible for general assistance or certain waiver programs is also eligible for Medicaid.

Principal Disabilities Served

☐ ALS
☐ Amputation
☐ Blind
☐ Cerebral Palsy
☐ Deaf
☐ Mental Retardation
☐ Multiple Sclerosis
☐ Muscular Dystrophy
☐ Musculo-Skeletal Injury
☐ Other Neuromuscular Diseases
☐ Spina Bifida
☐ Spinal Cord Injury
☐ Traumatic Head Injury
☐ Other
■ All of the Above

Principal Technology Services Funded

■ Information
■ Referral
■ Assessment
■ Recommendations
☐ Ordering
☐ Fitting
■ Fabrication
■ Evaluation
■ Training
■ Maintenance/Repair
☐ Follow-Up
■ Equipment (see below)
☐ Other

Primary Areas of Equipment Funded

■ Aids for Daily Living
☐ Augmentative Communication
☐ Computer Applications
☐ Environmental Control Systems
☐ Home/Worksite Modifications
■ Prosthetics and Orthotics
☐ Seating and Positioning
■ Aids for Vision/Hearing Impaired
■ Wheelchairs/Mobility Aids
☐ Vehicle Modifications
■ Other

Services and/or Equipment Typically Not Funded:

Helpful Hints:
Durable medical equipment and services must be for use by the individual in their residence, must be medically necessary, and must have been prescribed by a physician. Product literature and letters of support can help the application. The equipment must be reasonable and necessary for diagnosis or treatment of an illness or injury or improve the function of a malformed body member. Orthotic appliances are those items employed for correction or prevention of skeletal deformities. Prosthetic devices replace all or part of the function of a permanently inoperative or malfunctioning body organ. The individual's illness or injury must be considered in resolving coverage issues in each case. The Omnibus Budget Reconciliation Act also adds "other health care needs". Historically this has not included communication devices or computers, but they are *not* specifically excluded either.

Ohio Medicare
Social Security Administration
550 Main Street
Cincinnati, OH 45202

For information contact:
1-800-234-5772

Description:
Medicare is a hospital and medical insurance program administered by the Social Security Administration for covered persons who are either 65 years of age or older, or who are (at any age) blind, totally and permanently disabled, and have been receiving Social Security disability payments for 24 months, or have end-stage renal disease.

Eligibility Criteria:
Medicare has two parts: Part A (Hospital Insurance) pays the expenses of an individual in a hospital, skilled nursing facility or at home when receiving services provided by a home health agency. Part B (Medical Insurance) helps pay for physician services, outpatient hospital services, medical services and supplies, outpatient physical therapy and other health care services. Many Medicare recipients are also eligible for Medicaid benefits. Medicaid pays the Part B insurance premiums plus the coinsurance and deductible amounts and other charges sponsored by Medicaid but not covered by Medicare. In cases of crossover, Medicare regulations apply.

Principal Disabilities Served

☐ ALS
☐ Amputation
☐ Blind
☐ Cerebral Palsy
☐ Deaf
☐ Mental Retardation
☐ Multiple Sclerosis
☐ Muscular Dystrophy
☐ Musculo-Skeletal Injury
☐ Other Neuromuscular Diseases
☐ Spina Bifida
☐ Spinal Cord Injury
☐ Traumatic Head Injury
☐ Other
■ All of the Above

Principal Technology Services Funded

☐ Information
☐ Referral
☐ Assessment
☐ Recommendations
☐ Ordering
☐ Fitting
☐ Fabrication
☐ Evaluation
☐ Training
☐ Maintenance/Repair
☐ Follow-Up
■ Equipment (see below)
☐ Other

Primary Areas of Equipment Funded

☐ Aids for Daily Living
☐ Augmentative Communication
☐ Computer Applications
☐ Environmental Control Systems
☐ Home/Worksite Modifications
■ Prosthetics and Orthotics
■ Seating and Positioning
☐ Aids for Vision/Hearing Impaired
■ Wheelchairs/Mobility Aids
☐ Vehicle Modifications
☐ Other

Services and/or Equipment Typically Not Funded:
Bathroom and toileting aids; vehicle modifications.

Helpful Hints:
Medicare limits payments to certain "covered services" deemed medically necessary based on Medicare regulations. Durable medical equipment and services must be for use by the individual in their residence, must be medically necessary, and must have been prescribed by a physician. The equipment must be reasonable and necessary for diagnosis or treatment of an illness or injury or improve the function of a malformed body member. The publication "Durable Medical Equipment-Screening List, Medicare Coverage Issues Manual HCFA-Pub 6" should be requested. If equipment is rented under Medicare, the dealer will monitor the equipment and provide service during the rental period.

Private Health Insurance Companies
Contact your individual insurance agent or group coverage representative.

For information contact:
Your agent, personnel benefits manager, or case manager (ask if your company uses case management).

Description:
Private insurance companies fund certain types of equipment, depending on the terms of the policy and the specific medical condition involved. Most policies fund durable medical equipment such as wheelchairs, braces, etc.

Eligibility Criteria:
Rehabilitation services are not specifically addressed in most policies, therefore each policy will differ. Some policies do not cover "pre-existing" conditions, but do cover accidental injuries or conditions which manifested after coverage began. Policies which cover only the hospital stay will usually fund devices if prescribed by a physician when the individual is in the hospital. Unless the policy specifically states that it will not pay for a specific aid or device, the individual should file a claim. If the equipment is necessary but does not fall within guidelines of the policy, the individual can ask to revise the policy or make exceptions to the rule. All denied claims should be resubmitted and appealed.

Principal Disabilities Served

☐ ALS
☐ Amputation
☐ Blind
☐ Cerebral Palsy
☐ Deaf
☐ Mental Retardation
☐ Multiple Sclerosis
☐ Muscular Dystrophy
☐ Musculo-Skeletal Injury
☐ Other Neuromuscular Diseases
☐ Spina Bifida
☐ Spinal Cord Injury
☐ Traumatic Head Injury
☐ Other
■ All of the Above

Principal Technology Services Funded

☐ Information
☐ Referral
☐ Assessment
☐ Recommendations
☐ Ordering
☐ Fitting
☐ Fabrication
☐ Evaluation
☐ Training
☐ Maintenance/Repair
☐ Follow-Up
■ Equipment (see below)
☐ Other

Primary Areas of Equipment Funded

■ Aids for Daily Living
☐ Augmentative Communication
☐ Computer Applications
☐ Environmental Control Systems
☐ Home/Worksite Modifications
■ Prosthetics and Orthotics
■ Seating and Positioning
☐ Aids for Vision/Hearing Impaired
■ Wheelchairs/Mobility Aids
☐ Vehicle Modifications
☐ Other

Services and/or Equipment Typically Not Funded:
Hearing aids, corrective lenses.

Helpful Hints:
Insurance companies should be approached before seeking out other sources of funding, even if chances are slim. Other funding sources may require a rejection from the insurance company. When submitting a request for insurance payment of equipment, the nature of the request may determine the outcome of the decision. Determinations are based on need, prognosis, diagnosis, and type of equipment. Information should include length of time the device will be used, projected improvement in quality of life, and increased independence. Terminology in the written recommendation is an important factor; for example, the wording "prescription as treatment of..." or "for problems resulting from..." the specific diagnosis or injury can be helpful. The recommendation should include brand names, model, price, product literature, and supporting letters from associated health professionals. (From the PAM Repeater, No. 42, September 1987.)

A-L13

Ohio Rehabilitation Services Commission
Vocational Rehabilitation Department
Enquirer Bldg., Suite 925
617 Vine Street
Cincinnati, OH 45202

For information contact:
513/852-3223

Description:
The 1986 Amendments to the 1973 Rehabilitation Act authorizes the provision of rehabilitation engineering/technology services to eligible individuals receiving vocational rehabilitation services.

Eligibility Criteria:
There must be a determination of a disabling condition (not visual impairment) and the handicapping condition must pose a significant obstacle to vocational/independent living functions and there must be a reasonable expectation that the services can assist the person to achieve gainful employment or function significantly more independently in the community.

Principal Disabilities Served

- ☐ ALS
- ☐ Amputation
- ☐ Blind
- ☐ Cerebral Palsy
- ☐ Deaf
- ☐ Mental Retardation
- ☐ Multiple Sclerosis
- ☐ Muscular Dystrophy
- ☐ Musculo-Skeletal Injury
- ☐ Other Neuromuscular Diseases
- ☐ Spina Bifida
- ☐ Spinal Cord Injury
- ☐ Traumatic Head Injury
- ☐ Other
- ■ All of the Above

Principal Technology Services Funded

- ■ Information
- ■ Referral
- ■ Assessment
- ■ Recommendations
- ■ Ordering
- ■ Fitting
- ■ Fabrication
- ■ Evaluation
- ■ Training
- ☐ Maintenance/Repair
- ☐ Follow-Up
- ■ Equipment (see below)
- ☐ Other

Primary Areas of Equipment Funded

- ■ Aids for Daily Living
- ■ Augmentative Communication
- ■ Computer Applications
- ■ Environmental Control Systems
- ■ Home/Worksite Modifications
- ■ Prosthetics and Orthotics
- ■ Seating and Positioning
- ■ Aids for Vision/Hearing Impaired
- ■ Wheelchairs/Mobility Aids
- ■ Vehicle Modifications
- ☐ Other

Services and/or Equipment Typically Not Funded:
Each case is evaluated on an individual basis.

Helpful Hints:
An individual should first contact their local VR area office. A counselor has to evaluate the individual and declare the individual eligible for VR services prior to completing an IWRP (Individualized Written Rehabilitation Program) recommending rehabilitation engineering services. These services include home accessibility, job modification, and health maintenance. Job modifications are expected to be cost-shared with the employer. VR uses an economy needs test in determining all case service expenditures. VR also administers Independent Living funds which, in some cases, can be used to purchase equipment.

To begin the process, write to the bureau including name, address, phone number, and disabling condition. This office serves Hamilton, Butler, Clinton, Clermont, and Warren counties. They can refer you to the appropriate office if you are outside these counties. Due to lack of monies, a person may be eligible for services, but not receive services because of a current directive to serve the severely disabled. In the Cincinnati area, Independent Living Options works with BSVI to provide Title 7, Part A monies for communication devices, computers, etc., BSVI eligibility is necessary.

Independent Living Services
Enquirer Bldg., Suite 905
617 Vine Street
Cincinnati, OH 45202

For information contact:
Gary Johnson, Liaison
513/852-3223

Principal Disabilities Served

☐ ALS
☐ Amputation
☐ Blind
☐ Cerebral Palsy
☐ Deaf
☐ Mental Retardation
☐ Multiple Sclerosis
☐ Muscular Dystrophy
☐ Musculo-Skeletal Injury
☐ Other Neuromuscular Diseases
☐ Spina Bifida
☐ Spinal Cord Injury
☐ Traumatic Head Injury
☐ Other
■ All of the Above

Principal Technology Services Funded

■ Information
■ Referral
■ Assessment
■ Recommendations
■ Ordering
■ Fitting
■ Fabrication
■ Evaluation
■ Training
☐ Maintenance/Repair
■ Follow-Up
■ Equipment (see below)
☐ Other

Primary Areas of Equipment Funded

■ Aids for Daily Living
■ Augmentative Communication
■ Computer Applications
■ Environmental Control Systems
■ Home/Worksite Modifications
■ Prosthetics and Orthotics
■ Seating and Positioning
■ Aids for Vision/Hearing Impaired
■ Wheelchairs/Mobility Aids
■ Vehicle Modifications
☐ Other

Ohio Rehabilitation Services Commission
Bureau of Services for the Visually Impaired
Enquirer Bldg., Suite 905
617 Vine Street
Cincinnati, OH 45202

For information contact:
513/852-3223

Description:
The 1986 Amendments to the 1973 Rehabilitation Act authorizes the provision of rehabilitation engineering/technology services to eligible individuals receiving vocational rehabilitation services.

Eligibility Criteria:
There must be a determination of a visual impairment which is the primary handicap. The handicapping conditions must pose a significant obstacle to vocational/independent living function, and there must be a reasonable expectation that the services can assist the person to achieve gainful employment or function significantly more independently in the community.

Principal Disabilities Served

☐ ALS
☐ Amputation
■ Blind
☐ Cerebral Palsy
☐ Deaf
☐ Mental Retardation
☐ Multiple Sclerosis
☐ Muscular Dystrophy
☐ Musculo-Skeletal Injury
☐ Other Neuromuscular Diseases
☐ Spina Bifida
☐ Spinal Cord Injury
☐ Traumatic Head Injury
☐ Other
☐ All of the Above

Principal Technology Services Funded

■ Information
■ Referral
■ Assessment
■ Recommendations
■ Ordering
■ Fitting
■ Fabrication
■ Evaluation
■ Training
☐ Maintenance/Repair
☐ Follow-Up
■ Equipment (see below)
☐ Other

Primary Areas of Equipment Funded

■ Aids for Daily Living
■ Augmentative Communication
■ Computer Applications
☐ Environmental Control Systems
■ Home/Worksite Modifications
■ Prosthetics and Orthotics
■ Seating and Positioning
■ Aids for Vision Impaired
■ Wheelchairs/Mobility Aids
■ Vehicle Modifications
☐ Other

Services and/or Equipment Typically Not Funded:
Each case is evaluated on an individual basis.

Source: SpeciaLink (1990). *Alternative and Assistive Funding of Alternative and Assistive Technology in Ohio: A Guide.*

USEFUL STRATEGIES WHEN APPLYING FOR FUNDING

1. Develop an understanding of the primary funding source and its relationship to other potential sources.
2. Maintain regular contact with the potential source. Direct calls and letters to the same person.
3. Communicate in writing whenever possible. Maintain a log of all contacts and information.
4. Review all policies and try your best to fully understand the policies and guidelines of the potential funding source.
5. Learn to use the language of the source. Provide substantial documentation from multiple sources of your need.
6. When questioned, try to educate and inform, emphasizing the long-term benefits to both the client and the source.
7. Provide all necessary documentation and be ready to appeal your request if denied.
8. Move on to secondary source(s) when efforts fail to bring success within appropriate timelines.

SUPPORTIVE DOCUMENTS FOR FUNDING REQUESTS

Physician's prescription

Letter of necessity from
    physician
    speech/language pathologist
    physical therapist
    occupational therapist
    teacher
    parents
    nurse
    rehabilitation counselor
    rehabilitation engineer

Insurance claim form

Photograph of the individual

General discussion of medical diagnosis

Literature describing the requested devices with specifications as they pertain to the individual

Explanation of the individual's functional skills without the equipment and how improved with the technology

Augmentative communication evaluation results including documentation that current methods are not sufficient for communication

Documentation of sources for additional support

OUTLINES FOR LETTERS OF MEDICAL NECESSITY

Physician's letter:

1. Medical History and Diagnosis
2. Prognosis
   a. Overall
   b. For speech
3. Degree of difficulty physician has in communicating with client
   a. Specific examples
4. Prescribed communication device or 'speech prosthesis'
   a. Why appropriate for medical purposes?
5. Additional supportive comments
   a. If the physician has seen the client use the device, comments regarding the client's effectiveness with the device should be included.

Speech Language Pathologist's letter:

1. Medical History and Diagnosis
2. Attempts at achieving verbal communication
   a. How long has client been in therapy
   b. Methods used to encourage verbal communication
3. Prognosis for speech
4. Client's present means of communication
   a. Why it is inappropriate/insufficient for medical purposes
5. Alternatives to present means of communication which have been investigated
   a. What they are
   b. Why they are not appropriate
6. Prescribed device
   a. Why more appropriate then above
7. Detailed description of client's trial period with prescribed device, if applicable.

A possible sentence for inclusion in the Speech/Language Pathologist's letter is:

> "Following extensive evaluation with this client, it is my professional opinion that the Touch (Light) Talker with Minspeak is the least expensive device which will adequately serve the communication needs of (client)."

Occupational Therapist's and Physical Therapist's letters

1. Medical History and Diagnosis
2. Length of treatment
3. How does lack of verbal communication hinder therapy?
4. Document (if applicable) client's inability to use manual communication
5. How would verbal communication allow client to receive maximum benefit from therapy?
6. Additional supportive comments:
   a. If the therapist has seen the client use the device, comments about the client's effective use of the device should be included.

Parent's letter:

1. Medical History and Diagnosis
2. Prognosis for speech
3. Describe specific medical situations in which your child's medical needs were not attended to within reasonable amounts of time due to communication barriers between the client and primary care givers (parents, physician, nurses, etc.).

(*See Medical Necessity sheet for more ideas.)

Teacher's letter:

1. Medical history and diagnosis
2. Length of time you have provided services
3. Describe specific situations, if appropriate, in which the client was ill or not feeling well and how this was handled within your classroom. Many teachers have reported incidents in which the client was ill and they interpreted it as "the client was having a bad day."
4. How would verbal communication allow this client to receive more timely medical care?
5. Additional supportive comments:
   a. If you have seen the client using the above device, comments regarding its effectiveness should be included.
   b. Provide comments regarding the client's ability to physically access the device.

SAMPLE

The Child Health Center
89 MAIN STREET / NORWAY MAINE 04268 / (207) 743-7034

December 4, 1987

To Whom It May Concern

Re: (d.o.b.)

Dear Sirs:

I am writing in my role as the personal physician for , now 4½ years old. has been a patient of mine since his birth. His medical diagnoses include severe spastic quadraparesis secondary to perinatal asphyxia. I am writing at this time to express my strong support for his obtaining an augmentive communication device. 's severe cerebral palsy makes it impossible for him to communicate through normal vocalization, and this will continue to be the case in the future. Obviously, there are many reasons why he needs to have some way to communicate with the outside world. There is ample evidence that he possesses the cognitive abilities to communicate but because of the cerebral palsy lacks the physical ability to talk. From a medical point of view, it is exceedingly difficult to manage him without any way to have direct communication with him. He has no way that he can communicate a report of his symptoms or concerns, and that hampers my ability to manage him medically. Because of his severe neurologic problems, he is at some medical risk for sudden problems, and I am fearful that without any means of communication that these problems could not be recognized in a timely fashion. Furthermore, those working with to improve his physical functions, such as physical therapists, are not able to work at maximal benefit because of the communication limitations.

In sum, the modern medical management of severe cerebral palsy is generally considered to include augmentative communication assistance as an integral part of a program. I strongly urge that funding of such a device be covered under his insurance policy for the above-noted reasons. If you have any questions please feel free to contact me.

Sincerely,

Stephen F. Bauer, M.D.

SFB:rm

A-H24

Androscoggin Home Health Services Inc.
79 Main Street, P.O. Box 400
Auburn, Maine 04210
(207) 784-9304
Toll Free 1-800-482-7412

Main Street
rmington, Maine 04938
lephone 778-3523

Winter Street
rway, Maine 04268
lephone 743-7301

1 Knox Street
umford, Maine 04276
lephone 364-2723

SAMPLE

November 30, 1987

RE:
DOB:

Dear Sirs:

is a four year nine month old boy who has athetoid cerebral palsy with severe spasticity involving all four extremities. He is non-verbal and unable to communicate his medical and emotional needs.

I have worked with for the past three years in the home environment; speech and language therapy has emphasized developing a method to help express his basic needs. is limited in his expression due to his lack of verbalizations. Initially,he was taught to communicate his needs via eye gaze; however, this limited him to objects and places in his immediate environment. His pointing skills have improved in the past few months; therefore, his non-verbal expressive vocabulary has increased but is limited to the few pictures that he is able to point to on his tray.

The Touch Talker is the most effective speech prosthesis for He was evaluated at Maine Medical Center, Portland, Maine on 02/06/87 and this instrument was recommended as "the most efficient encoded symbol system." Subsequently, the Touch Talker was rented from Prentke Romich Inc. for a two-week period to determine whether or not this system was appropriate for He easily learned the encoded symbol system and the smiles and laughs that he expressed revealed an understanding that at last he was beginning to establish some independence in his environment. He seemed delighted by the synthesized speech that he was able to activate by pointing to a specific symbol. Since he is incapable of physiologically producing speech, this was the first time that he was able to elicit meaningful verbalizations. He was able to express to his parents when he was hungry or thirsty. Instead of crying, and the parents having to guess what was upsetting their son, he was able to express in a meaningful way what it was that he wanted or needed. cried when The Touch Talker was taken away from him and he was told that it had to be returned.

receptive language abilities and cognition are close to or at chronological age level. His problem, specific to speech and language needs, is his lack of meaningful expressive language skills. understands what he feels but is unable to express his physical and emotional needs.

(Con'd)

This has caused extreme frustration evidenced by temper tantrums, crying, and whining. Several times during our therapy sessions right hand would become caught underneath his lap tray. At first a look of pain would appear on face. If I was unable to guess the cause he would then start to cry since the pain was most likely increasing. would then start screaming until finally, after a process of elimination, I was able to determine the cause of his pain. With The Touch Talker he would be able to immediately express the problem without increased pain or stress.

Due to lack of verbal expression potty-training has been unsuccessful. He has been unable to communicate when he has to go or has already gone in his diapers. His crying indicated discomfort but, again, this problem could not be solved until his parents or therapist were able to determine the cause. Once again, due to lack of verbal communication, his was unable to express his discomfort or distress.

therapeutic team not only feels that The Touch Talker is the most efficient speech prosthesis for him but, since it is one that will grow with through various programming methods as his medical and emotional needs expand, another electronic communicator devise would not be required. Therefore, the insurance company would not be requested to fund another speech prosthesis as he grows emotionally.

Thank you for your consideration of The Touch Talker and helping become an independent person with the ability to express medical and emotional needs.

Lynne Williams Garrow, MACCC SLP

Lynne Williams Garrow
MA CCC-SLP

LWG/ddw

A-T9

MEDICAL PROGRAMS

Private Payment

Private Health Insurance

Federal/State Health Care Programs

- Medicaid
- Medicare
- Bureau for Children with Medical Handicaps

STATE AND GOVERNMENT AGENCIES

Ohio Rehabilitation Services Commission

Bureau of Services for Visually Impaired

Ohio Department of Mental Retardation/Developmental Disabilities

Ohio Department of Education, Division of Special Education

Ohio Department of Human Services, Bureau of Medicaid Policy

Governor's Office of Advocacy

Ohio Department of Education, Division of Early Childhood

TRUST FUNDS, FOUNDATIONS, AND CORPORATIONS

NONPROFIT AND SERVICE GROUPS

Kiwanis

Rotary

Telephone Pioneers

Lions

Quota Club

Sertoma

United Cerebral Palsy

Easter Seal Society

Muscular Dystrophy Association

Churches/Synagogues

United Way

March of Dimes

FUNDRAISERS

WISH MAKERS

Percy Ross
Sunshine Foundation
Make-a-Wish Foundation

PUBLIC APPEAL

FUNDING STEPS

- Obtain a technology evaluation for your child
- Locate a funding advocate
- Start with primary funding sources
- Gather supportive materials
- Document all originals, steps, and contacts
- Submit your request — use appropriate jargon
- Set time limit
- Appeal if necessary
- Be patient!!

Source: Preschool Integration Through Technology Systems, (PITTS), United Cerebral Palsy Association of Western New York, Inc., 4635 Union Rd., Buffalo, NY 14225; US DOE Grant #H024E80010

FUNDING

Recent data have shown that the most critical component of the funding process is the FUNDING ADVOCATE. The funding advocate can be a family member, case manager, educator, friend, or anyone who is willing to invest time in procuring funding for an individual's assistive device. Persistence and dedication are important qualities for the funding advocate as the process can be lengthy. Guidance from a resource person who is familiar with the funding process is extremely helpful and can be located by contacting your local medical or educational agency or the manufacturer or sales representative for the system/device.

The first source of funding to explore is Medical Coverage. This category would include private payment, private health insurance, and federal/state health care programs (Medicaid, Medicare, or the Bureau of Medical Handicaps). Requests based on medically-related needs should reference speech prosthesis and inability to communicate critical medical information. An appeal process generally follows if a denial for prior approval occurs. Clarification of information or additional information may be needed for the appeal. A resource person familiar with the funding process would be helpful in providing suggestions throughout this procedure. As of this date, Medicare has funded few communication devices. Organizations are lobbying to make changes in the Medicaid regulations. At this time, long term care facility residents have a better chance to get funding through Medicaid than other applicants. Please refer to the resources listed on the last page of this section.

Funding through Educational Agencies, Schools, and Vocational Rehabilitation Programs can be researched if appropriate during the processing of the insurance claim. State/federal programs would include, but are not limited to, the following: State Department of Mental Retardation/Developmentally Disabled, Bureau for Children with Medical Handicaps, Rehabilitation Services Commission (BVR), Veteran's Administration, and Worker's Compensation. The school can be contacted for assistance with educationally related issues for individuals age birth through 22 living within their school district boundaries. Schools have purchased devices for students, but this does not provide for flexibility since it belongs to the school system and is often not available for their personal use. Schools may require that the device stay in the school and would prevent communication in other critical settings. If the child moves out of the district or graduates, the device must stay with the school system.

Trust funds, foundations, and private corporations would be next on the list to contact as a funding source. Some trust funds and foundations designate money for specific or general purposes with guidelines for application. Directories can be found in libraries. Banks often have foundations and have this information available in the trust division of the main bank office. Large, national foundations receive many requests for funding, although small, local foundations may not be utilized because people are not aware of their existence. Local businesses/private corporations can be another source of funding as the company can use the contribution as a tax write-off or for public relations to boost their image.

The next source to pursue would be Nonprofit Civic Organizations/Service Clubs such as Kiwanis, Rotary, Lions, etc. These clubs have often contributed to the purchase of equipment, although they often offer to match contributions from other sources. Service Organizations such as United Cerebral Palsy (UCP), Easter Seal Society, Muscular Dystrophy Association, etc. tend to provide services for groups of people rather than individuals, although some contributions have been made for individuals. These service organizations may also assist you in making some connections with other sources for funding. Local chapters can be found in your telephone directory.

Fundraisers are next on the list with groups willing to sponsor private or public fundraising activities such as dances, bake sales, candy/product sales, etc. Wishmakers are a few people and organizations across the country which grant wishes for people. Two major sources are Percy Ross, author of "The Millionaire" newspaper column that runs in papers across the country, and **The Sunshine Foundation** for children with chronic disabilities (4010 Levick Street, Philadelphia, PA 19135).

After all sources of funding have been exhausted, a public appeal may be attempted. The family may or may not want to be placed in this public forum with newspaper and television appeals as well as pictures and information in local establishments.

Remember, funding is always available with persistence and dedication by the funding advocate and a little help from those who have experienced the process.

Components of a Medically Based Request

Since a medical insurance request is typically the first step that individuals make in the funding process, the following guidelines are presented.

Review the insurance policy dealing with Durable Medical Equipment, Prosthetics, and Orthotics. Your requests can focus on the terminology that they use for approved equipment while steering away from terms which are stated as exclusions. Identify a contact person to whom all correspondence and questions should be directed.

Include the following materials: (More specific guidelines, sample letters and forms available from the listed resources)

1. Prescription from the physician
2. Letter of medical necessity from the physician
3. Letter of medical necessity from the speech/language pathologist
4. Insurance Claim form
5. Literature describing the requested device

Additional information that is optional but strongly recommended:

1. Letters of medical necessity from occupational therapist, physical therapist, nurse, parents
2. Photographs of the individual
3. Communication Prosthesis Payment review summary (1988 Specialized Product/ Equipment Council) completed by the physician and speech/language pathologist
4. AAC Evaluation (including documentation that other methods of communication are not sufficient for communication)

When requesting that medical insurance provide funding, the main purpose of the device must be qualified for the medical request. Medical necessity must be clearly defined for medical insurance payment the same as would a request for accessing educational information to a school or for gainful employment to a vocational rehabilitation program. Two key ingredients in the medical requests are inclusion of the idea of speech prosthesis or replacing the function of a malfunctioning body part and the necessity of nonspeaking persons to be able to communicate critical medical needs to their physicians and primary caregivers. (Some policies, however, exclude the term "prosthesis.") Personal anecdotes regarding the latter are often effective.

Follow-Up Services

After a device is obtained, successful communication is dependent upon training of the family and school or vocational staff and the individual. It is often assumed that the individual can immediately use his/her system efficiently. Experience has proven that the provision of initial training and support is a necessary component of the entire process. Intensive therapy services through a speech/language pathologist, specialized clinic or educational agency to get the individual familiar with his/her system and able to communicate should be considered when the initial funding is requested. The assessment team should be able to provide assistance with the initial support needed or refer to appropriate sources. Support by linking up with other consumers and their families has also proven to be beneficial.

Funding Resources

Audiocassette: *Reimbursement Strategies for Assistive Devices* (audio teleconference held on August 23, 1989).

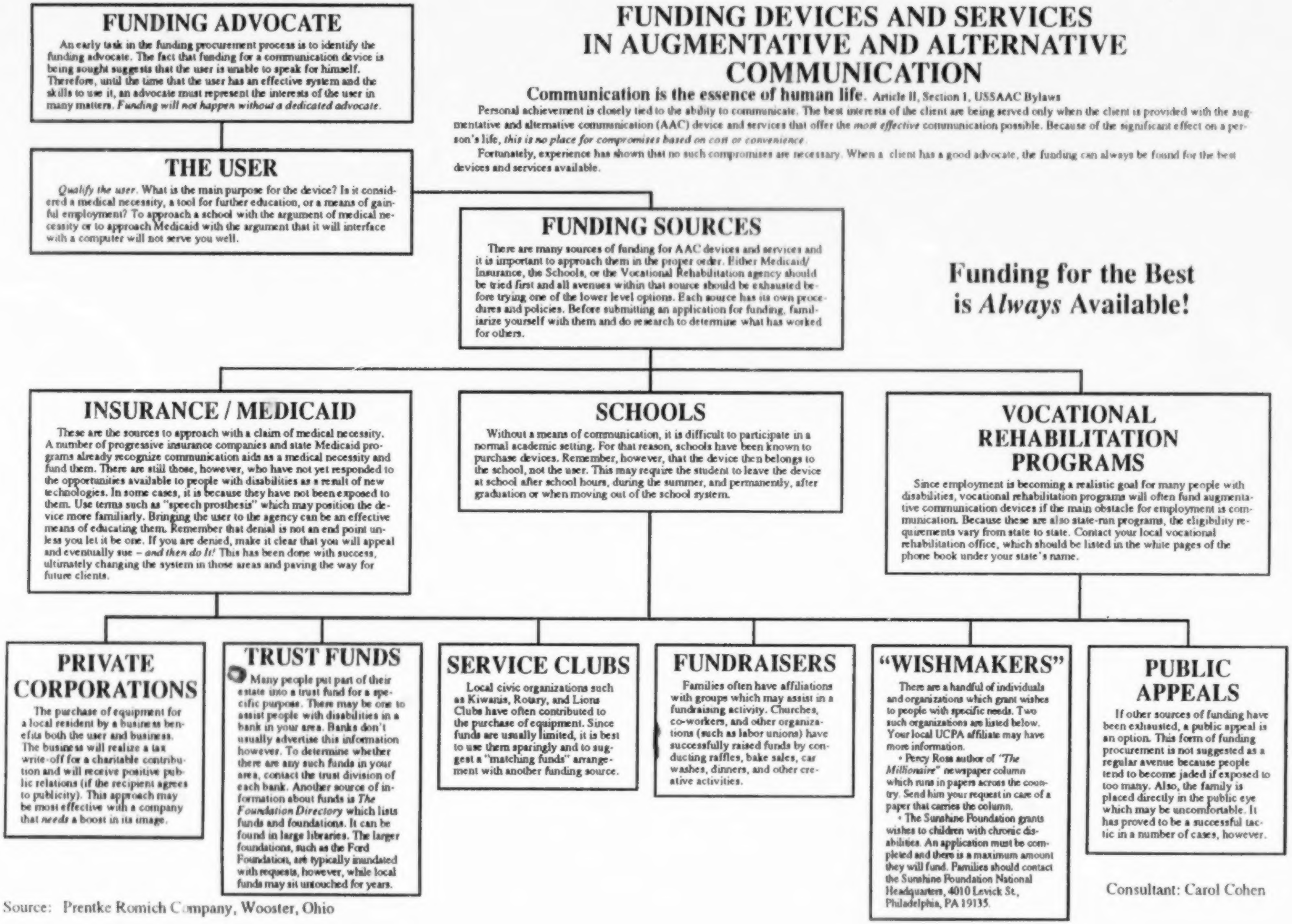
Funding for Assistive Technology and Related Services: An Annotated Bibliography, Alexander Enders, March, 1989, Electronic Industries Foundation, Rehabilitation Engineering Center, 1901 Pennsylvania Avenue, N.W., Suite 700, Washington, DC 20006.

How To Obtain Funding for Argumentative Communication Devices, 2/89. Prenke Romich Co., 1022 Heyl Road, Wooster, OH 44691. 800/262-1990 is helpline (free; contains sample letters).

Steps to Funding Ohio Augmentative Communication Problem Solving Consortium, May 1991.

The Many Faces of Funding, Anna C. Hoffman, Phonic Ear, 250 Camino Alto, Mill Valley, CA 94941, 415/383-4000 (sample letters).

Source: *Cuyahoga County Augmentative Communication Directory,* 1990.



FUNDING DEVICES AND SERVICES IN AUGMENTATIVE AND ALTERNATIVE COMMUNICATION

Communication is the essence of human life. Article II, Section 1, USSAAC Bylaws

Personal achievement is closely tied to the ability to communicate. The best interests of the client are being served only when the client is provided with the augmentative and alternative communication (AAC) device and services that offer the *most effective* communication possible. Because of the significant effect on a person's life, *this is no place for compromises based on cost or convenience*.

Fortunately, experience has shown that no such compromises are necessary. When a client has a good advocate, the funding can always be found for the best devices and services available.

FUNDING ADVOCATE

An early task in the funding procurement process is to identify the funding advocate. The fact that funding for a communication device is being sought suggests that the user is unable to speak for himself. Therefore, until the time that the user has an effective system and the skills to use it, an advocate must represent the interests of the user in many matters. *Funding will not happen without a dedicated advocate.*

THE USER

Qualify the user. What is the main purpose for the device? Is it considered a medical necessity, a tool for further education, or a means of gainful employment? To approach a school with the argument of medical necessity or to approach Medicaid with the argument that it will interface with a computer will not serve you well.

FUNDING SOURCES

There are many sources of funding for AAC devices and services and it is important to approach them in the proper order. Either Medicaid/Insurance, the Schools, or the Vocational Rehabilitation agency should be tried *first* and all avenues within that source should be exhausted before trying one of the lower level options. Each source has its own procedures and policies. Before submitting an application for funding, familiarize yourself with them and do research to determine what has worked for others.

Funding for the Best is *Always* Available!

INSURANCE / MEDICAID

These are the sources to approach with a claim of medical necessity. A number of progressive insurance companies and state Medicaid programs already recognize communication aids as a medical necessity and fund them. There are still those, however, who have not yet responded to the opportunities available to people with disabilities as a result of new technologies. In some cases, it is because they have not been exposed to them. Use terms such as "speech prosthesis" which may position the device more familiarly. Bringing the user to the agency can be an effective means of educating them. Remember that denial is not an end point unless you let it be one. If you are denied, make it clear that you will appeal and eventually sue – *and then do It!* This has been done with success, ultimately changing the system in those areas and paving the way for future clients.

SCHOOLS

Without a means of communication, it is difficult to participate in a normal academic setting. For that reason, schools have been known to purchase devices. Remember, however, that the device then belongs to the school, not the user. This may require the student to leave the device at school after school hours, during the summer, and permanently, after graduation or when moving out of the school system.

VOCATIONAL REHABILITATION PROGRAMS

Since employment is becoming a realistic goal for many people with disabilities, vocational rehabilitation programs will often fund augmentative communication devices if the main obstacle for employment is communication. Because these are also state-run programs, the eligibility requirements vary from state to state. Contact your local vocational rehabilitation office, which should be listed in the white pages of the phone book under your state's name.

PRIVATE CORPORATIONS

The purchase of equipment for a local resident by a business benefits both the user and business. The business will realize a tax write-off for a charitable contribution and will receive positive public relations (if the recipient agrees to publicity). This approach may be most effective with a company that *needs* a boost in its image.

TRUST FUNDS

Many people put part of their estate into a trust fund for a specific purpose. There may be one to assist people with disabilities in a bank in your area. Banks don't usually advertise this information however. To determine whether there are any such funds in your area, contact the trust division of each bank. Another source of information about funds is *The Foundation Directory* which lists funds and foundations. It can be found in large libraries. The larger foundations, such as the Ford Foundation, are typically inundated with requests, however, while local funds may sit untouched for years.

SERVICE CLUBS

Local civic organizations such as Kiwanis, Rotary, and Lions Clubs have often contributed to the purchase of equipment. Since funds are usually limited, it is best to use them sparingly and to suggest a "matching funds" arrangement with another funding source.

FUNDRAISERS

Families often have affiliations with groups which may assist in a fundraising activity. Churches, co-workers, and other organizations (such as labor unions) have successfully raised funds by conducting raffles, bake sales, car washes, dinners, and other creative activities.

"WISHMAKERS"

There are a handful of individuals and organizations which grant wishes to people with specific needs. Two such organizations are listed below. Your local UCPA affiliate may have more information.

- Percy Ross author of *"The Millionaire"* newspaper column which runs in papers across the country. Send him your request in care of a paper that carries the column.
- The Sunshine Foundation grants wishes to children with chronic disabilities. An application must be completed and there is a maximum amount they will fund. Families should contact the Sunshine Foundation National Headquarters, 4010 Levick St, Philadelphia, PA 19135.

PUBLIC APPEALS

If other sources of funding have been exhausted, a public appeal is an option. This form of funding procurement is not suggested as a regular avenue because people tend to become jaded if exposed to too many. Also, the family is placed directly in the public eye which may be uncomfortable. It has proved to be a successful tactic in a number of cases, however.

Source: Prentke Romich Company, Wooster, Ohio

Consultant: Carol Cohen

OHIO FUNDING AGENCIES AND RESOURCES

Easter Seal Society
2204 S. Hamilton Road
Columbus, OH 43232
614/868-9126

Make-A-Wish Foundation
2600 N. Central Avenue
Suite 936
Phoenix, AZ 85004
602/240-6600

Ohio Department of Health
Bureau for Children with Medical Handicaps
P.O. Box 1603
Columbus, OH 43266-0013

Ohio Department of Human Services
Division of Long Term Care
Bureau of Resident Services
Bureau of Community Services
Prior Authorization Coordinator
State Office Tower
33rd Floor
30 E. Broad Street
Columbus, OH 43266-0423
614/466-9243

Ohio Rehabilitation Services Commission
Bureau of Vocational Rehabilitation
Bureau of Services for the Visually Impaired
Independent Living
400 E. Campus View Boulevard
Columbus, OH 43232-4604
614/438-1200 (regional offices)
800/282-4536 (TDD)

Veteran's Administration
Benefits Information and Assistance
200 N. High Street
Room 309
Columbus, OH 43215
800/827-8272

Industrial Commission of Ohio
246 N. High Street
Columbus, OH 43266-0589
614/466-6136

Ohio Bureau of Workers' Compensation
30 W. Spring Street
Columbus, OH 43266-0581
614/466-1000 (regional offices)
800/282-9536

Ohio Department of Human Services
Benefits Administration
Bureau of Medicaid Policy
State Office Tower
30 E. Broad Street
31st Floor
Columbus, OH 43266-0423

Ohio Department of Mental Retardation/Developmental Disabilities
State Office Tower
30 E. Broad Street
10, 12, and 13th Floors
Columbus, OH 43266-0415
614/466-7508 (county MR/DD program or Family Resource Services Program)

Percy Ross
"Thanks a Million"
% Local Newspaper

Sunshine Foundation
4010 Levick Street
Philadelphia, PA 19135

United Cerebral Palsy of Ohio
P.O. Box 14780
Columbus, OH 43214

811

FUNDING RESOURCES

American Speech-Language-Hearing Association
1801 Rockville Pike
Rockville, MD 20852
301/897-5700
800/638-8255 (Consumer Hotline)

Governor's Office of Advocacy for People with Disabilities
7th Floor
8 E. Long Street
Columbus, OH 43266-0400
614/466-9956 (voice TDD)
800/228-5405 (voice/fax)

North East Ohio Society for Augmentative and Alternative Communication
Mace Mentch
Health Hill Hospital
2201 Martin Luther King Drive
Cleveland, OH 44052
216/721-5400 ext. 260, 285

Ohio Department of Education
Division of Special Education
933 High Street
Worthington, OH 43085
614/466-2650

Ohio Resource Center for Low Incidence and Severely Handicapped
470 Glenmont Avenue
Columbus, OH 43214-3292
614/262-6131 (voice)
614/262-1070 (TDD/fax)
will provide Special Education Resource Center contacts

United States Society for Augmentative and Alternative Communication (USSAAC)
% Barkley Memorial Center
University of Nebraska
Lincoln, NE 68588
402/472-5463

Association for Retarded Citizens
360 S. Third Street
Suite 101
Columbus, OH 43215

Center for Special Education Technology
Council for Exceptional Children
1920 Association Drive
Reston, VA 22091-1589
800/873-8255
Selected readings: Funding Technology Products and Services

National Rehabilitation Information Center
8455 Colesville Road
Suite 935
Silver Spring, MD 20910
301/588-9284
several funding publications

Ohio Coalition for the Education of Handicapped Children
933 High Street
Suite 106
Worthington, OH 43085
614/431-1307

Ohio Legal Rights Services
8 E. Long Street
5th Floor
Columbus, OH 43266-0523 614/466-7264

Ohio Speech and Hearing Association
9331 S. Union Road
Miamisburg, OH 45342
800/866-6742

LEVEL: ADMINISTRATOR

GOAL: **#6** Gain practical information regarding obtaining funding for assistive technology devices and services.

COMPETENCY TYPE: SKILL

OBJECTIVE: Participants will review and discuss school districts level of responsibility for provision of assistive technology devices and services as interpreted within current federal special education mandates.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
1. Large or small group activity Pass out copies of Handout A-H28, *Department of Education Policy Letter.* Explain that this letter (OSEP, 1991) has been heralded as a "clarification" of a child's rights to receive assistive technology and services under federal special education mandates. After allowing participants to read, pose the following questions: – What ARE the school's responsibilities for the provision of technology? – Why has this type of "clarification" been necessary? – What are issues which may possibly interfere with the implementation of these mandates? – How can these issues be effectively resolved so as to ensure the rights of children who require technology devices and services in order to benefit from a free aprpopriate public education? – How can schools work effectively with the funding advocate to ensure that all possible funding sources are being investigated?	1. Handout (A-H28) *Department of Education Policy Letter* See page 3 of Handout, "Overview of Policy Letter"	

DEPARTMENT OF EDUCATION
POLICY LETTER

August 10, 1991

Dear Ms. Goodman:

This is in response to your recent letter to the Office of Special Education Programs (OSEP) concerning obligations of public agencies under Part B of the Education of the Handicapped Act (EHA-B) to provide assistive technology to children with handicaps.

Specifically, your letter asks:

1. Can a school district presumptively deny assistive technology to a handicapped student?
2. Should the need for assistive technology be considered on an individual case-by-case basis in the development of the child's Individual Education Program?

In brief, it is impermissible under EHA-B for public agencies (including school districts) "to presumptively deny assistive technology" to a child with handicaps before a determination is made as to whether such technology is an element of a free appropriate public education (FAPE) for that child. Thus, consideration of a child's need for assistive technology must occur on a case-by-case basis in connection with the development of a child's individualized education program (IEP).

We note that your inquiry does not define the term "assistive technology" and that the term is not used either in the EHA-B statute or regulations. The Technology-Related Assistance for Individual with Disabilites Act of 1988, P.L. 100-407, contains broad definitions of both the terms "assistive technology device" and "assistive technology service." *See* Section 3 of P.L. 100-407, codified as 29 U.S.C. 2201, 2202. Our response will use "assistive technology" to encompass both "assistive technology services" and "assistive technology devices."

Under EHA-B, state and local educational agencies have a responsibility to ensure that eligible children with handicaps receive FAPE, which includes the provision of special education and related services without charge, in conformity with an IEP. 20 U.S.C. 1401 (18); 34 CFR Section 300.4, (a) and (d). The term "special education" is defined as "specially designed instruction, at no cost to the parent, to meet the unique needs of a handicapped child..." 34 CFR Section 300.14(a). Further, "related services" is defined as including "transportation and such developmental, corrective, and other supportive services as are required to assist a handicapped child to benefit from special education." 34 CFR Section 300.13(a).

The EHA-B regulation includes as examples 13 services that qualify as "related services" under EHA-B. *See* 34 CFR Section 300.13(b)(1)-(13). We emphasize that this list "is not exhaustive and may include other developmental, corrective, or other supportive services ... if they are required to assist a handicapped child to benefit from special education." 34 CFR Section 300.13 and *Comment*. Thus, under EHA-B, "assistive technology" could qualify as "special education" or "related services."

A determination of what is an appropriate educational program for each child must be individualized and must be reflected in the content of each child's IEP. Each child's IEP must be developed at a meeting which includes parents and school officials. 34 CFR Section 300.343-300.344. Thus, if the participants on the IEP team determine that a child with handicaps requires assistive technology in order to receive FAPE, and designate such assistive technology as either special education or a related service, the child's IEP must include a specific statement of such services, including the nature and amount of such services. 34 CFR Section 300.346(c); App. C to 34 CFR Part 300 (Ques. 51).

EHA-B's least restrictive environment (LRE) provisions require each agency to ensure "(t)hat special classes, separate schooling or other removal of handicapped children from the regular educational environment occurs only when the nature or severity of the handicap is such that education in regular classes with the use of supplementary aids and services cannot be achieved satisfactorily." 34 CFR Section 300.550(b)(2); *see also* Analysis to Final Regulations published as Appendix A to 45 CFR Part 121a, 42 F.R. 42511-13 (August 23, 1977). Assistive technology can be a form of supplementary aid or service utilized to facilitate a child's education in a regular educational environment. Such supplementary aids and services, or modifications to the regular education program, must be included in a child's IEP. *Id.* Appendix C to 34 CFR Part 300 (Ques. 48).

In sum, a child's need for assistive technology must be determined on a case-by-case basis and could be special education, related services, or supplementary aids and services for children with handicaps who are educated in regular classes.

I hope the above information has been helpful. If we may provide further assistance, please let me know.

Judy A. Schrag, Ed.D.
Director
Office of Special Education Programs
United States Department of Education
Office of Special Education and Rehabilitative Services

Overview Of Policy Letter

Office Of Special Education Programs Clarifies Right To Assistive Technology

United Cerebral Palsy Associations (UCPA), Inc. working in cooperation with Susan Goodman, an attorney and a parent of a child with a disability, have successfully secured a new policy letter from the Office of Special Education Programs (OSEP) that clarifies the right of a child with a disability to assistive technology devices and services under P.L. 94-142, the federal mandate for a free appropriate public education.

The letter issued on August 10, 1991 states clearly:

—school districts cannot presumptively deny assistive technology to a student with a disability;

—the need for assistive technology must be considered on an individual case by case basis in the development of the child's individual education program (IEP);

—assistive technology can be special education or a related service;

—assistive technology can also be a form of supplementary aid or service utilized to facilitate a child's education in a regular education environment;

—if participants on the IEP team determine a child requires assistive technology in order to receive a free appropriate public education, and designate such assistive technology as either special education or a related service, then the services must be provided at no cost to the parents.

LEVEL: ADMINISTRATOR

GOAL: **#6** Gain practical information regarding obtaining funding for assistive technology devices and services.

COMPETENCY TYPE: VALUE/ATTITUDE

OBJECTIVE: Participants will appreciate that funding for the best *is* always available — the necessary ingredients are PATIENCE and PERSISTENCE.

ENABLING ACTIVITIES	RESOURCES/MEDIA/READINGS	LEADER NOTES
1. Small group activity Pass out case studies A and B to the group. After everyone has read them, split the group in half. Ask Group A to meet together for five minutes and generate a list of words or phrases which describe the advocate in Case A. Similarly, ask Group B to generate a list which describes the "advocate" in Case B.	1. Handout (A-H29) *Case Studies A/B*	
2. Large group activity After 5-10 minutes of group discussion, record the characteristics of Advocate A in a bright colored marker on the Flip Chart. The group will probably offer words like "patient," "dedicated," "unceasing," "informed," "well-connected," "persistent," etc. Record the characteristics of "advocate" B in black marker. You'll probably hear "doubting," "unorganized," "uninformed," etc. Remind participants that research has shown that the most critical determinant in the successful obtaining of funding is the presence of a strong advocate. Most literature cites two primary characteristics. Ask participants which two characteristics are most important. Point out that they are PATIENCE and PERSISTENCE.	2. Flip Chart, bright marker, black marker	
3. Large group activity Close with Transparency A-T15, *Funding for the best is always available.*	3. Transparency (A-T15) *Funding for the best is always available*	

CASE A

Brian is a five year old with a progressive neurological disorder which severely affects his speech. At age three, his mother worked closely with school officials and a local clinic to secure an appropriate evaluation of his needs for an augmentative communication system. Mrs. S. talked with the specialist at the clinic and learned the names of two other parents who had success in securing funding for their children's devices through private medical insurance. The specialist also explained to Mrs. S. the need for supportive letters from multiple sources proving medical necessity for her medical insurance. Mrs. S. contacted the other parents and arranged to meet them and their children over the next weeks. During this period, she also scheduled an appointment with her insurance representative and received information regarding necessary steps for submitting her claim. Contact with the specialist at the AAC clinic resulted in her realization that she should also talk with Ohio Rehab Services and Medicaid to see if Brian might qualify for funding. She followed up by scheduling appointments and receiving claim information.

Visits with parents resulted in gaining many tips. She learned that making the claim more personal with the inclusion of photographs would increase her chances. With copies of letters from the others, she began to outline what information she needed included in letters from Brian's physician, speech therapist, occupational therapist, and preschool teacher. She scheduled appointments with each of them, and prepared materials for each meeting. At each, she asked for their support in specific ways. She explained carefully and clearly what information was needed in their respective letters of recommendation. Over the next three months, she was able to gather all supportive documentation, and submitted her claim. She called her contact person weekly with firm but positive reminders of the urgency of Brian's needs. Meanwhile, she submitted a Medicaid claim, using the same documentation.

When the refusal was received from private insurance, Mrs. S. was disappointed, but decided to contact the other parents again to see if their experience also included the need for appeal. Once again, Mrs. S. met with another parent and found out how to initiate a successful appeal. She learned that allowing the insurance representative to become more personally in touch with the child was often helpful. She invited the representative to visit Brian at his school, and when this was successful, she planned a time when Brian could accompany her on her regular visit to meet with the representative. At this visit, she provided a direct opportunity for the representative to see the large degree to which Brian was unable to communicate. Mrs. S. also asked the AAC Specialist to provide an ongoing observational log of Brian's inability to communicate his vital daily medical needs.

Mrs. S. asked the specialist to accompany her and Brian to the appeal hearing. The specialist provided oral and written testimony with video clips from his preschool setting. Additional documentation was also provided from his teacher and therapists.

After two more weeks, Mrs. S. and Brian learned that the request had been approved. Mrs. S. now works at the local AAC clinic as a parent-to-parent volunteer.

CASE B

Another child at Brian's school is Ben, a five year old with severe communication difficulties resulting from cerebral palsy. Ben's teacher asked his case manager, Ms. X if an augmentative communication system had ever been investigated for Ben. The caseworker shared the following information:

Almost two years before, Ms. X had been asked by her supervisor to coordinate funding pursual for a device that had been recommended by his teacher at that time. Ben's parents had asked for community donations, but had collected only $200. Ms. X had offered to help by sending letters to local organizations, but had gotten no replies. Ms. X said she also had called the parent's private insurance, and after no forms were sent for three months, she called and made another request for forms. Six months later, the parents mentioned at Ben's IEP meeting that they had completed and sent the forms. When the claim was denied, the letter had stated that the request did not seem to involve a medical need. The parents and Ms. X seemed to feel that they had "given it their best effort."

A-T15

Funding for the best *is* always available!

Funding success is 100% dependent upon the perseverance of the client advocate.

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